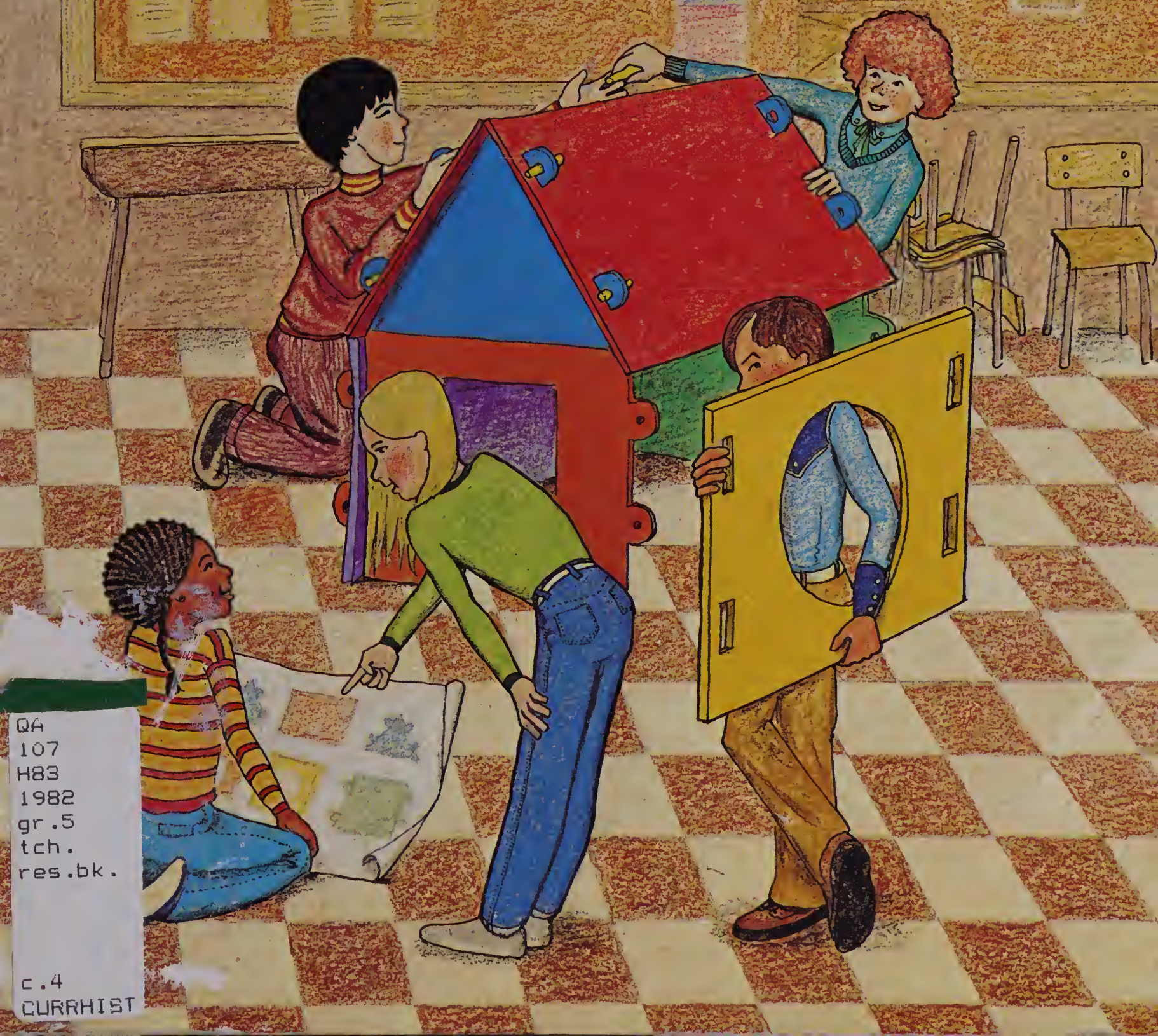


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Houghton Mifflin 5 Mathematics 5 Teacher's Resource Book



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Houghton Mifflin Mathematics 5

Teacher's Resource Book

Authors

Irvin K. Burbank

Richard Holmes

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Editorial Adviser

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Introduction

Development

Houghton Mifflin Mathematics is developed in six strands: **Numeration, Arithmetic, Geometry, Measurement, Graphing** and **Problem Solving**. The first five strands are treated in a *block* approach. Fourteen 24-page units are devoted to the strands. This allows for continuity and easier reinforcement and retention of mathematical skills. Problem Solving is an integral part of the entire program and is treated within all of the five other strands. (See *Problem Solving*.)

A typical unit of *Houghton Mifflin Mathematics* contains ten lessons, each on a two-page layout. Each lesson treats only one objective. The objectives are numbered by a computer code to allow easy tracking of skills for reinforcement and remediation. (See *Learning Objectives*, Page T13.) This approach provides learning in “bite-sized bits” to ensure students master the objective before proceeding to the next level of difficulty.

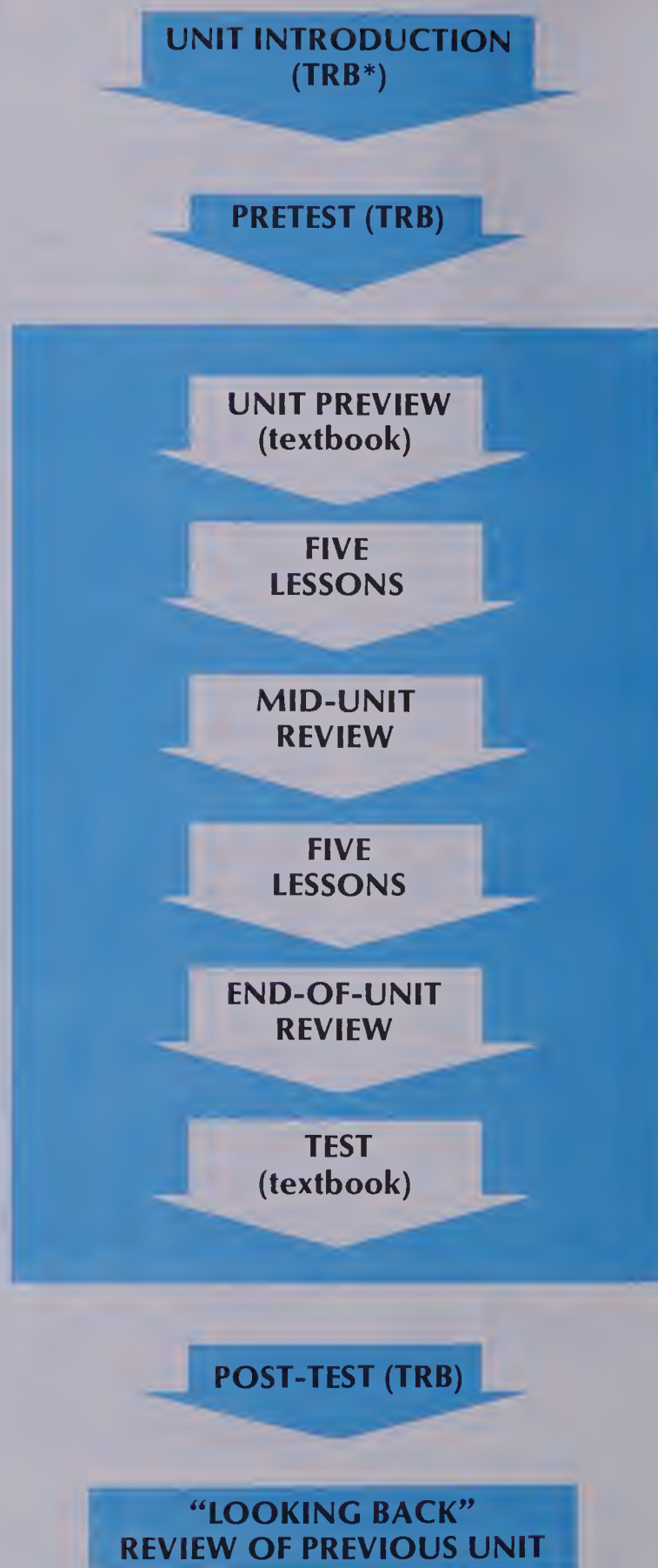
Organization

A typical unit of *Houghton Mifflin Mathematics* follows the sequence shown in the flow chart.

The Introduction in the TRB (Teacher’s Resource Book) will give some mathematical and pedagogical background to the unit. As well, the *Ideas* section provides some useful suggestions for integrating the theme and/or other subject areas with the mathematical content of the unit.

The “Preview” is simply a practice page that reviews some prerequisite skill that will be needed for success in the core lessons of the unit. The lessons are organized in two sections with a mini-review after each section. The “Looking Back” page provides practice in the main strand of the previous unit.

A typical unit will take about three weeks including introductory activities, lessons, reviews, and tests. This allows one day for most lessons. It may be suggested that more time be spent on certain important or difficult topics. Enriched classes may cover a unit in two weeks, while others may take four or more weeks.



*Teacher’s Resource Book

Review and Testing

The authors of *Houghton Mifflin Mathematics* recognize the importance of skill reinforcement so that students remember what they have been taught from week to week and from year to year. The textbook and *Teacher's Resource Book* have been designed to provide sufficient review and testing resources at the times when they will be most useful. The program contains the following features.

1. An optional **Pretest** in the TRB. This will be especially useful early in the school year to place your students' ability. However, some students may have already learned some later topics in different strands, so the pretest may be used with discretion throughout the school year. Once the level of the students' ability has been placed, the pretest may still be used as a practice sheet or an extra post-test.
2. A **mid-unit Review** provides practice in all the objectives covered in the first half of a unit. As with all testing material, the questions are clearly labelled by objective. A chart in the TRB pinpoints the lesson and page number where the skill can be reviewed if necessary.
3. An **end-of-unit Review** provides practice in all the objectives of the second half of the unit and has the same diagnostic features as the mid-unit Review.
4. The **Test** in the textbook provides clusters of questions on each objective. The test may be assigned simply for extra practice.
5. A **Post-test** is reproduced in the TRB and has the advantage that the students have had no prior access to it.
6. The **Looking Back** at the end of each unit provides extra practice and reinforcement in the strand covered by the previous unit.
7. **Extra Practice** is available for every lesson in Houghton Mifflin's Testing and Practice Masters. The half-page black-line masters are reproduced with answers in the TRB.
8. **Cumulative Tests** for groups of units are provided in the back of the textbook.
9. The back pages of the textbook also provide **Extra Practice** in core objectives of the grade level.

Unit 2

Pretest

Add or subtract

1. $\begin{array}{r} 6 \\ +6 \\ \hline \end{array}$	2. $\begin{array}{r} 11 \\ -8 \\ \hline \end{array}$	3. $\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$	4. $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$	5. $\begin{array}{r} 15 \\ -6 \\ \hline \end{array}$
---	--	---	---	--

6. $5 + 8 =$ 7. $4 + 9 =$ 8. $10 - 7 =$ 9. $18 - 9 =$

10. $\begin{array}{r} 41 \\ +26 \\ \hline \end{array}$ 11. $\begin{array}{r} 92 \\ +7 \\ \hline \end{array}$ 12. $\begin{array}{r} 35 \\ -12 \\ \hline \end{array}$ 13. $\begin{array}{r} 87 \\ -36 \\ \hline \end{array}$ 14. $\begin{array}{r} 48 \\ -18 \\ \hline \end{array}$

15. $\begin{array}{r} 27 \\ +9 \\ \hline \end{array}$ 16. $\begin{array}{r} 43 \\ +8 \\ \hline \end{array}$ 17. $\begin{array}{r} 25 \\ +5 \\ \hline \end{array}$ 18. $\begin{array}{r} 36 \\ -7 \\ \hline \end{array}$ 19. $\begin{array}{r} 51 \\ -4 \\ \hline \end{array}$

20. **REVIEW**

Add

1. $\begin{array}{r} 7 \\ +6 \\ \hline \end{array}$	2. $\begin{array}{r} 2 \\ +9 \\ \hline \end{array}$	3. $\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$	4. $\begin{array}{r} 8 \\ +5 \\ \hline \end{array}$	5. $\begin{array}{r} 6 \\ +4 \\ \hline \end{array}$
---	---	---	---	---

25. $5 + 8 =$ 26. $4 + 9 =$ 27. $10 - 7 =$ 28. $18 - 9 =$

29. **REVIEW**

Add

1. $\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$	2. $\begin{array}{r} 5 \\ +1 \\ \hline \end{array}$	3. $\begin{array}{r} 6 \\ +4 \\ \hline \end{array}$	4. $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$	5. $\begin{array}{r} 9 \\ +1 \\ \hline \end{array}$
---	---	---	---	---

34. $8 + 7 =$ 35. $9 + 6 =$ 36. $10 - 7 =$ 37. $18 - 9 =$

TEST **UNIT 2**

Add or subtract

Post-test

Unit 2

Add or subtract

1. $\begin{array}{r} 7 \\ +5 \\ \hline \end{array}$	2. $\begin{array}{r} 4 \\ +6 \\ \hline \end{array}$	3. $\begin{array}{r} 8 \\ +7 \\ \hline \end{array}$	4. $\begin{array}{r} 15 \\ -9 \\ \hline \end{array}$	5. $\begin{array}{r} 16 \\ -7 \\ \hline \end{array}$
---	---	---	--	--

6. $5 + 9 =$ 7. $9 + 7 =$ 8. $12 - 6 =$ 9. $17 - 8 =$

LOOKING BACK **ADD / SUBTRACT**

Add

1. $\begin{array}{r} 3 \\ +5 \\ \hline \end{array}$	2. $\begin{array}{r} 24 \\ +4 \\ \hline \end{array}$	3. $\begin{array}{r} 53 \\ +44 \\ \hline \end{array}$	4. $\begin{array}{r} 430 \\ +19 \\ \hline \end{array}$	5. $\begin{array}{r} 503 \\ +184 \\ \hline \end{array}$
---	--	---	--	---

6. $\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$ 7. $\begin{array}{r} 47 \\ +6 \\ \hline \end{array}$ 8. $\begin{array}{r} 25 \\ +36 \\ \hline \end{array}$ 9. $\begin{array}{r} 854 \\ +29 \\ \hline \end{array}$ 10. $\begin{array}{r} 626 \\ +137 \\ \hline \end{array}$

11. $\begin{array}{r} 70 \\ +89 \\ \hline \end{array}$ 12. $\begin{array}{r} 64 \\ +58 \\ \hline \end{array}$ 13. $\begin{array}{r} 714 \\ +97 \\ \hline \end{array}$ 14. $\begin{array}{r} 507 \\ +197 \\ \hline \end{array}$ 15. $\begin{array}{r} 618 \\ +294 \\ \hline \end{array}$

16. $\begin{array}{r} 1604 \\ +163 \\ \hline \end{array}$ 17. $\begin{array}{r} 8563 \\ +218 \\ \hline \end{array}$ 18. $\begin{array}{r} 5119 \\ +3467 \\ \hline \end{array}$ 19. $\begin{array}{r} 3669 \\ +4054 \\ \hline \end{array}$ 20. $\begin{array}{r} 2758 \\ +2758 \\ \hline \end{array}$

Extra Practice Worksheet A1 Pages 22-23

Add or subtract

Cumulative Test

UNITS 1-4

Addition

1. $\begin{array}{r} 8 \\ +0 \\ \hline \end{array}$	2. $\begin{array}{r} 9 \\ +4 \\ \hline \end{array}$	3. $\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$	4. $\begin{array}{r} 3 \\ +5 \\ \hline \end{array}$	5. $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$
---	---	---	---	---

6. $9 + 7 =$ 7. $3 + 8 =$ 8. $4 + 5 =$ 9. $6 + 8 =$ 10. $7 + 9 =$

11. $\begin{array}{r} 30 \\ +2 \\ \hline \end{array}$ 12. $\begin{array}{r} 74 \\ +6 \\ \hline \end{array}$ 13. $\begin{array}{r} 58 \\ +7 \\ \hline \end{array}$ 14. $\begin{array}{r} 56 \\ +5 \\ \hline \end{array}$ 15. $\begin{array}{r} 9 \\ +36 \\ \hline \end{array}$

16. $\begin{array}{r} 36 \\ +51 \\ \hline \end{array}$ 17. $\begin{array}{r} 46 \\ +27 \\ \hline \end{array}$ 18. $\begin{array}{r} 62 \\ +24 \\ \hline \end{array}$ 19. $\begin{array}{r} 58 \\ +33 \\ \hline \end{array}$ 20. $\begin{array}{r} 74 \\ +36 \\ \hline \end{array}$

21. $\begin{array}{r} 4 \\ +7 \\ \hline \end{array}$ 22. $\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$ 23. $\begin{array}{r} 24 \\ +14 \\ \hline \end{array}$ 24. $\begin{array}{r} 16 \\ +53 \\ \hline \end{array}$ 25. $\begin{array}{r} 356 \\ +213 \\ \hline \end{array}$

26. $\begin{array}{r} 416 \\ +5 \\ \hline \end{array}$ 27. $\begin{array}{r} 607 \\ +8 \\ \hline \end{array}$ 28. $\begin{array}{r} 86 \\ +254 \\ \hline \end{array}$ 29. $\begin{array}{r} 846 \\ +57 \\ \hline \end{array}$ 30. $\begin{array}{r} 65 \\ +238 \\ \hline \end{array}$

31. $\begin{array}{r} 407 \\ +305 \\ \hline \end{array}$ 32. $\begin{array}{r} 174 \\ +237 \\ \hline \end{array}$ 33. $\begin{array}{r} 335 \\ +176 \\ \hline \end{array}$ 34. $\begin{array}{r} 218 \\ +362 \\ \hline \end{array}$ 35. $\begin{array}{r} 699 \\ +105 \\ \hline \end{array}$

36. $\begin{array}{r} 3857 \\ +153 \\ \hline \end{array}$ 37. $\begin{array}{r} 643 \\ +1228 \\ \hline \end{array}$ 38. $\begin{array}{r} 574 \\ +3268 \\ \hline \end{array}$ 39. $\begin{array}{r} 4369 \\ +138 \\ \hline \end{array}$ 40. $\begin{array}{r} 507 \\ +4197 \\ \hline \end{array}$

41. $\begin{array}{r} 3594 \\ +5609 \\ \hline \end{array}$ 42. $\begin{array}{r} 2788 \\ +2585 \\ \hline \end{array}$ 43. $\begin{array}{r} 6487 \\ +1036 \\ \hline \end{array}$ 44. $\begin{array}{r} 3296 \\ +5917 \\ \hline \end{array}$ 45. $\begin{array}{r} 3897 \\ +5984 \\ \hline \end{array}$

46. $\begin{array}{r} 0.4 \\ +0.3 \\ \hline \end{array}$ 47. $\begin{array}{r} 0.8 \\ +0.5 \\ \hline \end{array}$ 48. $\begin{array}{r} 6.9 \\ +4.7 \\ \hline \end{array}$ 49. $\begin{array}{r} 14.3 \\ +8.9 \\ \hline \end{array}$ 50. $\begin{array}{r} 97.32 \\ +187.67 \\ \hline \end{array}$

51. $0.9 + 0.7 =$ 52. $41.8 + 2.7 =$ 53. $189.4 + 8.5 =$

Problem Solving

Problem Solving is an area of study receiving increased emphasis in the elementary mathematics curriculum. It is not enough for students simply to master basic mathematical skills. In today's world, they must be able to apply those skills to solve practical, real-world problems.

The first step in this process involves interpretation of simple, routine problem situations, given first in pictures, then in words. Beyond that, a complete mathematics program must give the students an armoury of strategies with which to attack all types of problems, routine and non-routine. Such strategies include drawing diagrams, guesswork, using a model, estimation, looking for patterns, making lists, simplifying or rewording the problem, and many more. In addition, *Houghton Mifflin Mathematics* teaches a simple four-step strategy for attacking routine word problems. See the Scope & Sequence on page T21 for a complete list of problem-solving objectives for this grade level.

Houghton Mifflin Mathematics deals with problem solving in six different ways.

1. Lesson Introductions.

Every possible lesson is introduced with a word problem. This puts the mathematical concept in a real-world context and also gives the student experience with the key words and phrases that may be used in problems associated with the mathematical objective.

2. Practice Section.

Every possible lesson includes more problems in the *Practice* section. The students are given experience with the different ways similar types of problems can be phrased. Thus, they should then be better able to recognize problems by type when they encounter them in sets of mixed problems.

3. Problem Solving Lessons.

Almost every unit has at least one full lesson on problem solving. These lessons teach the basic four-step strategy for routine word problems and also other strategies for attacking many types of problems.

4. Something Extra.

The section in the textbook at the bottom right of every lesson provides more challenging non-routine problems for enrichment.

5. Teacher's Resource Book and Practice Masters.

The Teacher's Resource Book provides extra material for all levels of ability. The Extra Practice sections provide more problems for the average student. These are available separately on Houghton Mifflin's *Testing and Practice Masters*. The *Reinforcement* sections provide ideas for alternative types of practice and for re-teaching for students of lower ability. The *Enrichment* section provides challenges for better students, and also give ideas for open-ended (divergent) mathematical investigations.

6. Problem Solving Activities.

Every grade level has a separate booklet of problem solving activities, correlated to the lessons in the textbook. These booklets provide ample opportunity for students to extend their problem solving abilities even further.



Mathematics for the 80's

Are these your priorities?

Problem Solving

Real-World Applications

In-Depth Developmental Lessons

One Strand Block Units

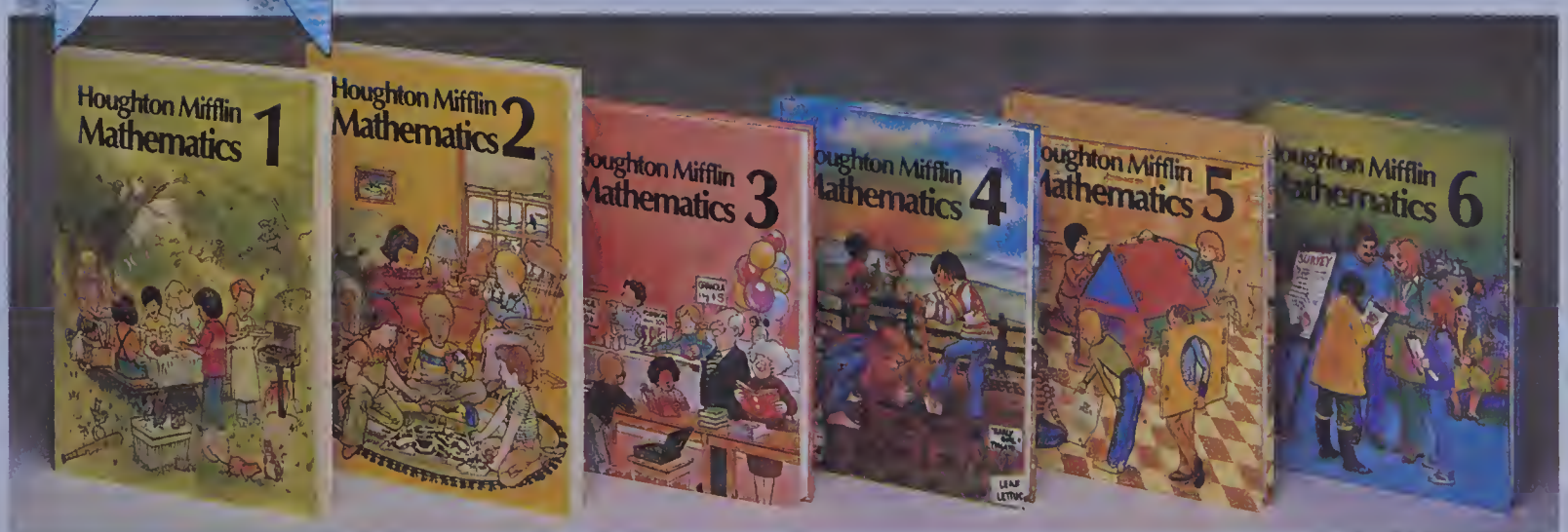
Ready-to-Use Teacher's Resource Books

Individualized Learning Materials

Testing and Management Programs

Year-Round Motivational Features

...Then here is your program!



Houghton Mifflin Mathematics

The Student Text and Teacher Resource Book

Student Objectives coded for easy tracking and reviewing.

Functional, full colour illustrations.

Introductory activity emphasizing prerequisite skills, using concrete experiences.

Textbook develops skills from problem solving, real world situations.

Lesson plan involving both concrete materials and textbook pages using pictorial representation (semi-concrete).

Developmental Exercises to work with the students to assure that the objective is mastered.

Teacher's Resource Book page number corresponds to pupil's textbook.

UNIT 3 LESSON 2

Objective A10

Add two- and three-digit numbers, regroup tens.

Introducing the Lesson

Show the students the following models and ask them about the regrouping that should be done.



2 flats, 12 rods, 4 cubes

The students should decide that the 12 rods can be regrouped as 1 flat and 2 rods.



3 flats, 2 rods, 4 cubes

Summarize the modelling with these place-value charts:

100s	10s	1s	=	100s	10s	1s
2	12	4		3	2	4

Try several other similar examples.

Teaching the Lesson

Discuss the bowling problem at the top of page 48. Model the required addition with place-value number blocks. Point out that it is easiest to add cubes first.



"Adding cubes, there are 6. Add the rods. Since there are 12 rods, regroup them as 1 flat and 2 rods. Then add."



3 flats, 2 rods, 6 cubes
or, 3 hundreds, 2 tens, 6 ones
or, $300 + 20 + 6$
or, 326

Have the students practise modelling and recording several other similar addition examples. Use problems with three addends as well.

48

Regrouping Tens

MY SCORES ARE 175 AND 151. WHAT'S MY TOTAL?

Write the question

$$\begin{array}{r} 175 \\ + 151 \\ \hline \end{array}$$

Add ones

$$\begin{array}{r} 175 \\ + 151 \\ \hline 6 \end{array}$$

Add tens

$$\begin{array}{r} 175 \\ + 151 \\ \hline 126 \end{array}$$

12 tens is 1 hundred and 2 tens. Regroup

$$\begin{array}{r} 1 \\ 175 \\ + 151 \\ \hline 326 \end{array}$$

Add hundreds

$$\begin{array}{r} 1 \\ 175 \\ + 151 \\ \hline 326 \end{array}$$

The total score for the 2 games is 326

EXERCISES

Add

1. $\begin{array}{r} 47 \\ + 60 \\ \hline 107 \end{array}$	2. $\begin{array}{r} 52 \\ + 64 \\ \hline 116 \end{array}$	3. $\begin{array}{r} 65 \\ + 83 \\ \hline 148 \end{array}$	4. $\begin{array}{r} 90 \\ + 33 \\ \hline 123 \end{array}$	5. $\begin{array}{r} 81 \\ + 84 \\ \hline 165 \end{array}$
6. $\begin{array}{r} 347 \\ + 60 \\ \hline 407 \end{array}$	7. $\begin{array}{r} 152 \\ + 64 \\ \hline 216 \end{array}$	8. $\begin{array}{r} 565 \\ + 83 \\ \hline 648 \end{array}$	9. $\begin{array}{r} 290 \\ + 33 \\ \hline 323 \end{array}$	10. $\begin{array}{r} 381 \\ + 84 \\ \hline 465 \end{array}$
11. $\begin{array}{r} 274 \\ + 382 \\ \hline 656 \end{array}$	12. $\begin{array}{r} 490 \\ + 255 \\ \hline 745 \end{array}$	13. $\begin{array}{r} 528 \\ + 191 \\ \hline 719 \end{array}$	14. $\begin{array}{r} 742 \\ + 170 \\ \hline 912 \end{array}$	15. $\begin{array}{r} 382 \\ + 382 \\ \hline 764 \end{array}$
16. $\begin{array}{r} 451 \\ + 450 \\ \hline 901 \end{array}$	17. $\begin{array}{r} 163 \\ + 466 \\ \hline 629 \end{array}$	18. $\begin{array}{r} 283 \\ + 571 \\ \hline 854 \end{array}$	19. $\begin{array}{r} 394 \\ + 482 \\ \hline 876 \end{array}$	20. $\begin{array}{r} 671 \\ + 291 \\ \hline 962 \end{array}$

Using the Exercises

- Questions 1 to 5 are paired with Questions 6 to 10 to provide practice first with regrouping tens with two-digit addends and then with regrouping tens with a three- and a two-digit addend.
- Questions 11 to 20 provide examples with three-digit addends requiring the regrouping of tens.

The Teacher's Resource Book provides black-and-white reproductions of the textbook pages with full answers and annotations.

Description of developmental exercises aids in teaching the skill and diagnosing problems.

provide a complete learning and teaching package.

PRACTICE

Find the sum

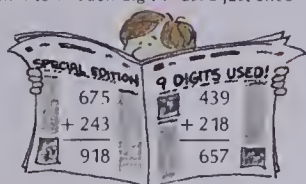
- | | | | | |
|---|---|--|---|--|
| 1. $\begin{array}{r} 52 \\ + 67 \\ \hline 119 \end{array}$ | 2. $\begin{array}{r} 78 \\ + 91 \\ \hline 169 \end{array}$ | 3. $\begin{array}{r} 43 \\ + 92 \\ \hline 135 \end{array}$ | 4. $\begin{array}{r} 60 \\ + 84 \\ \hline 144 \end{array}$ | 5. $\begin{array}{r} 35 \\ + 83 \\ \hline 118 \end{array}$ |
| 6. $\begin{array}{r} 161 \\ + 263 \\ \hline 424 \end{array}$ | 7. $\begin{array}{r} 472 \\ + 180 \\ \hline 652 \end{array}$ | 8. $\begin{array}{r} 553 \\ + 283 \\ \hline 836 \end{array}$ | 9. $\begin{array}{r} 661 \\ + 174 \\ \hline 835 \end{array}$ | 10. $\begin{array}{r} 391 \\ + 267 \\ \hline 658 \end{array}$ |
| 11. $\begin{array}{r} 274 \\ + 274 \\ \hline 548 \end{array}$ | 12. $\begin{array}{r} 451 \\ + 478 \\ \hline 929 \end{array}$ | 13. $\begin{array}{r} 584 \\ + 95 \\ \hline 679 \end{array}$ | 14. $\begin{array}{r} 293 \\ + 102 \\ \hline 486 \end{array}$ | 15. $\begin{array}{r} 341 \\ + 245 \\ + 231 \\ \hline 817 \end{array}$ |

Solve

16. During a bowling tournament, Sam scored 180 and 178 for his first two games. What was Sam's total score for these two games? **358**
17. Joanne was practising for a bowling tournament and scored 189 and 191 on two games. What was her total score for the two games? **380**

Special Addition

Each addition question below uses all of the digits from 1 to 9. Each digit is used just once.



Make up other addition questions like the ones above.

Answers may vary

49

Assigning the Practice

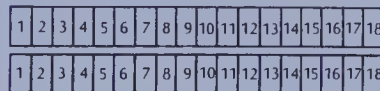
Minimum: 1-10

Average: 1-17

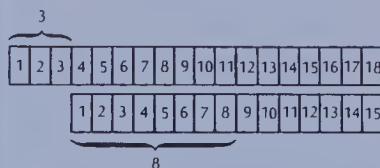
Enriched: 6-17

Reinforcement

Students can make "adding machines" according to the following directions: Cut out two centimetre square strips. There should be at least 18 squares on each strip. Number the squares from left to right.



To add, for example, $3 + 8$, move the bottom strip so its left end is at the edge of the '3' square of the top strip. Then find the '8' on the bottom strip. The sum of 3 and 8 is above the '8' on the bottom strip.



Enrichment

1. The *Special Addition* challenge, page 49, will have to be solved by a method of trial and error. It provides addition practice, but may be frustrating for all but the highly motivated students.

2. Ask the students to find a true statement about each:

- the sum of two even numbers;
- the sum of two odd numbers; and
- the sum of an even number and an odd number.

Problem Solving Activities

Assign Level 4, page 6.

49

Assignments for students of 3 levels of ability.

Practice exercises for skill mastery.

Reinforcement provides alternative types of practice and ideas for reteaching.

Word problems in every possible lesson.

Enrichment in both textbook and Teacher's Resource Book to keep the gifted child involved.

Extra Practice Masters (available separately) are reproduced here for every lesson.

Extra Problem Solving Activities (available separately) for each unit.

Extra Practice

Worksheet A10

Pages 48-49

Rewrite the number as hundreds and tens

1. 11 tens = 1 hundred + 1 ten
2. 46 tens = 4 hundreds + 6 tens
3. 30 tens = 3 hundreds + 0 tens
4. 18 tens = 1 hundred + 8 tens

Add

- | | | | | |
|---|---|--|---|---|
| 5. $\begin{array}{r} 343 \\ + 182 \\ \hline 525 \end{array}$ | 6. $\begin{array}{r} 256 \\ + 71 \\ \hline 327 \end{array}$ | 7. $\begin{array}{r} 480 \\ + 390 \\ \hline 870 \end{array}$ | 8. $\begin{array}{r} 544 \\ + 95 \\ \hline 639 \end{array}$ | 9. $\begin{array}{r} 347 \\ + 261 \\ \hline 608 \end{array}$ |
| 10. $\begin{array}{r} 182 \\ + 777 \\ \hline 959 \end{array}$ | 11. $\begin{array}{r} 396 \\ + 112 \\ \hline 508 \end{array}$ | 12. $\begin{array}{r} 68 \\ + 341 \\ \hline 409 \end{array}$ | 13. $\begin{array}{r} 290 \\ + 675 \\ \hline 965 \end{array}$ | 14. $\begin{array}{r} 328 \\ + 280 \\ \hline 608 \end{array}$ |

Houghton Mifflin Mathematics was developed by an experienced team of educators and consultants from across Canada.

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Houghton Mifflin Mathematics

PROBLEM SOLVING

- ☐ Sequenced lessons teach problem solving strategies.
- ☐ The unique *IDEA* strategy keeps your pupils on track.
- ☐ Problem solving questions in every lesson maintain performance.

REAL-WORLD APPLICATIONS

- ☐ Every unit is developed through a real-world theme.
- ☐ Lessons are introduced by a real-world problem.
- ☐ Exercises include real-world applications.

IN-DEPTH DEVELOPMENTAL LESSONS

- ☐ Each lesson is devoted to a single objective.
- ☐ Skills are based upon understanding, using concrete materials.
- ☐ Developmental exercises make objectives easy to learn.

ONE STRAND BLOCK UNITS

- ☐ Each unit is devoted to the development of one strand.
- ☐ Each unit provides thorough practice for objectives.
- ☐ Each unit reviews, tests, and reinforces objectives.

READY-TO-USE TEACHER'S RESOURCE BOOKS

- ☐ The Resource Book contains detailed lesson plans.
- ☐ The Resource Book provides both reinforcement and enrichment activities.
- ☐ The Resource Book has complete answers to exercises and practice.

INDIVIDUALIZED LEARNING MATERIALS

- ☐ Every unit provides Pre-tests and Post-tests for readiness and assessment.
- ☐ Every unit has provisions for remediation and enrichment.
- ☐ Every unit has built-in reviews and cumulative reviews

TESTING AND MANAGEMENT PROGRAMS

- ☐ The textbook has unit tests and cumulative tests.
- ☐ The Resource Book contains extra practice and evaluation material.
- ☐ The Resource Book uses coded objectives to establish a diagnostic system.

YEAR-ROUND MOTIVATIONAL FEATURES

- ☐ Every lesson has functional and appealing artwork.
- ☐ Every lesson has a challenging "Something Extra" including calculator activities and computer literacy.
- ☐ Every unit has an interesting child-oriented theme.

Book 1
1-98001
1-98011
1-98021
1-98031

Pupil's Workbook
Teacher's Resource Book
Testing and Practice Masters
Problem Solving Activities

Book 2
1-98002
1-98012
1-98022
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Pupil's Workbook
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Pupil's Textbook
Teacher's Resource Book
Testing and Practice Masters
Problem Solving Activities

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Learning Objectives

The following objectives are covered in depth in *Houghton Mifflin Mathematics 5*.

Numeration

		Lesson	Pages
N1	Extend the numeration system to hundred thousands.	1-1	2-3
N2	Extend the numeration system to hundred millions.	1-2	4-5
N3	Compare numbers using $<$, $=$, or $>$.	1-3	6-7
N4	Round to the nearest ten, hundred, thousand, or ten thousand.	1-4	8-9
N5	Write tenths using decimal notation.	1-5	10-11
N6	Write hundredths using decimal notation.	1-6	12-13
N7	Write decimals equal to or greater than 1.	1-7	14-15
N8	Compare decimals using $<$, $=$, or $>$.	1-8	16-17
N9	Annex zeros to compare decimals.	1-9	18-19
N10	Round decimals to the nearest whole number.	1-10	20-21
N11	Write the fraction for part of a set.	7-1	146-147
N12	Understand ratio.	7-4	152-153
N13	Express and generate proportional ratios.	7-5	154-155
N14	Solve for the missing number in proportional ratios.	7-6	156-157
N15	Write equivalent fractions.	7-7	158-159
N16	Find the decimal equivalents of fractions.	7-8	160-161
N17	Compare fractions.	7-9	162-163
N18	Round decimals to the nearest tenth; estimate products.	9-7	206-207
N19	Extend the numeration system to thousandths.	11-1	242-243
N20	Regroup tenths, hundredths, and thousandths.	11-2	244-245
N21	Understand the meaning of percent.	11-8	256-257
N22	Read and write Roman numerals.	13-9	306-307
N23	Write a fraction as a mixed numeral and vice versa.	14-3	318-319

Arithmetic

		Lesson	Pages
A1	Add two-digit numbers, with and without regrouping.	2-1	26-27
A2	Add three-digit numbers, with and without regrouping.	2-2	28-29
A3	Add more than two numbers.	2-3	30-31
A4	Add four- and five-digit numbers.	2-4	32-33
A5	Subtract two-digit numbers, with regrouping.	2-5	34-35
A6	Subtract three-digit numbers, with regrouping.	2-6	36-37
A7	Subtract four-digit numbers, with regrouping.	2-7	38-39
A8	Add and subtract decimals in tenths.	2-8	40-41
A9	Add and subtract decimals in hundredths.	2-9	42-43
A10	Multiply a multiple of 10 by a one-digit multiplier.	3-1	50-51
A11	Multiply a two-digit multiplicand by a one-digit multiplier.	3-2	52-53
A12	Multiply a multiple of 10, 100, or 1000 by a one-digit multiplier.	3-3	54-55
A13	Multiply a three- or four-digit multiplicand by a one-digit multiplier.	3-4	56-57
A14	Multiply a two-digit multiplicand by a multiple of 10.	3-5	58-59
A15	Multiply a two-digit multiplicand by a two-digit multiplier less than 20.	3-6	60-61
A16	Multiply a two-digit multiplicand by a two-digit multiplier.	3-7	62-63
A17	Multiply a decimal in tenths by a one- or two-digit multiplier.	3-9	66-67
A18	Divide a two-digit dividend by a one-digit divisor (one EMS cycle), with or without remainders.	4-1	74-75
A19	Divide a three-digit dividend by a one-digit divisor (one EMS cycle), where the first two digits of the dividend are a multiple of the divisor.	4-2	76-77
A20	Divide a two- or three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.	4-3	78-79
A21	Divide a three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.	4-4	80-81
A22	Divide a three-digit dividend by a one-digit divisor (three EMS cycles), with remainders.	4-5	82-83
A23	Divide a four-digit dividend by a one-digit divisor (three EMS cycles), with remainders.	4-6	84-85
A24	Divide a four-digit dividend by a one-digit divisor (four EMS cycles), with remainders.	4-7	86-87
A25	Divide with zero in the quotient.	4-8	88-89

A26	Multiply a three-digit multiple of 10 by a two-digit number.	6-1	122-123
A27	Estimate the product of a three-digit and a two-digit number.	6-2	124-125
A28	Multiply a three-digit number by a two-digit number.	6-3	126-127
A29	Divide a two- or three-digit dividend by a two-digit divisor (one stage) with or without a remainder.	6-5	130-131
A30	Divide a three-digit dividend by a two-digit divisor (one stage), with or without a remainder.	6-6	132-133
A31	Divide a three- or four-digit dividend by a two-digit multiple of ten (two stages).	6-7	134-135
A32	Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.	6-8	136-137
A33	Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.	6-9	138-139
A34	Find the fractional part of a set using unit fractions.	7-2	148-149
A35	Find the fractional part of a set using more than unit fractions.	7-3	150-151
A36	Multiply a decimal less than one in hundredths by a whole number.	9-1	194-195
A37	Multiply a decimal greater than one in hundredths by a whole number.	9-2	196-197
A38	Multiply a whole number by a decimal in tenths.	9-3	198-199
A39	Multiply a decimal less than one in tenths by another decimal in the same form.	9-4	200-201
A40	Multiply a decimal greater than one in tenths by a decimal less than one in tenths.	9-5	202-203
A41	Multiply a decimal greater than one in tenths by another decimal in the same form.	9-6	204-205
A42	Divide a decimal in tenths or hundredths by a whole number without a remainder.	9-8	208-209
A43	Write a fraction as a decimal in tenths, hundredths, or thousandths.	9-9	210-211
A44	Add and subtract thousandths.	11-3	246-247
A45	Multiply thousandths by a whole number.	11-4	248-249
A46	Recognize, write, and use rates.	11-5	250-251
A47	Use rates to find and compare prices.	11-6	252-253
A48	Use rates to find speed.	11-7	254-255
A49	Find the percent of a number.	11-9	258-259
A50	Find the average of a set of numbers.	12-1	266-267
A51	Calculate multiples.	13-1	290-291
A52	Find the least common multiple (LCM) of two or three numbers.	13-2	292-293
A53	Recognize numbers divisible by 2, 5, 10, and 9.	13-3	294-295
A54	Find the factors of a whole number.	13-4	296-297
A55	Identify prime and composite numbers.	13-5	298-299
A56	Find the greatest common factors (GCF) of two or three numbers.	13-6	300-301
A57	Use the rules for order of operations to simplify number expressions.	13-7	302-303
A58	Use the commutative, associative, and distributive properties to simplify calculations.	13-8	304-305
A59	Add fractions with like denominators.	14-1	314-315
A60	Subtract fractions with like denominators.	14-2	316-317
A61	Add mixed numerals with like denominators.	14-4	320-321
A62	Subtract fractions from whole numbers.	14-5	322-323
A63	Subtract mixed numerals with like denominators.	14-6	324-325
A64	Understand the meaning of probability; find probabilities.	14-7	326-327

Geometry

		Lesson	Pages
G1	Identify and name points and vertices, line segments, lines, and rays.	10-1	218-219
G2	Identify the lines of symmetry of plane figures.	10-2	220-221
G3	Identify plane figures (polygons).	10-3	222-223
G4	Describe a slide on a coordinate grid.	10-4	224-225
G5	Identify and describe a flip of a plane figure over a line.	10-5	226-227
G6	Identify and describe a quarter turn, a half turn, and a three-quarter turn image of a plane figure about a point.	10-6	228-229
G7	Identify plane figures that have the same shape and the same size (congruent figures).	10-7	230-231
G8	Name corresponding sides and corresponding vertices of congruent polygons.	10-8	232-233
G9	Identify and construct tiling patterns (tessellations).	10-9	234-235
G10	Identify figures that are similar.	12-5	274-275
G11	Draw similar figures; enlarge figures.	12-6	276-277
G12	Interpret and make scale drawings.	12-7	278-279

Measurement

		Lesson	Pages
M1	Multiply money.	3-8	64-65
M2	Estimate and read temperatures in degrees Celsius.	3-10	68-69
M3	Divide with money.	4-9	90-91
M4	Measure length using millimetres, centimetres, metres, or kilometres.	5-1	98-99
M5	Find the perimeter of a figure.	5-2	100-101
M6	Find the area of a figure by counting square units.	5-3	102-103
M7	Find the area of a rectangle.	5-4	104-105
M8	Find the volume of a rectangular prism.	5-5	106-107
M9	Measure capacity using litres and millilitres.	5-6	108-109
M10	Measure mass using grams, kilograms, and tonnes.	5-7	110-111
M11	Classify angles as right angles, less than right angles, or more than right angles.	5-8	112-113
M12	Measure angles with a protractor.	5-9	114-115
M13	Multiply money.	6-4	128-129
M14	Find the radius, diameter, and circumference of a circle.	8-8	184-185
M15	Add and subtract money.	12-2	268-269
M16	Count change up to \$20.00.	12-3	270-271
M17	Read timetables.	12-8	280-281
M18	Use a time zone map.	12-9	282-283

Graphing

		Lesson	Pages
GR1	Interpret and make pictographs.	8-1	170-171
GR2	Interpret and make bar graphs.	8-2	172-173
GR3	Interpret and draw line graphs.	8-3	174-175
GR4	Understand the meaning and usefulness of coordinates or ordered pairs.	8-4	176-177
GR5	Locate points on a grid for given coordinates and write the coordinates of given grid points.	8-5	178-179
GR6	Find the second coordinate of an ordered pair, given the first coordinate and the rule for the ordered pair.	8-6	180-181
GR7	Locate places on a map using coordinates.	8-7	182-183
GR8	Interpret and make circle graphs.	8-9	186-187

Problem Solving

		Lesson	Pages
PS1	Read and interpret charts to solve problems involving the comparison and ordering of related facts.	1-11	22
PS2	Solve word problems involving addition and subtraction.	2-10	44-45
PS3	Solve problems involving multiplication or division.	4-10	92-93
PS4	Choose the correct operation in problem solving.	5-10	116-117
PS5	Solve problems that have extraneous information.	6-10	140-141
PS6	Recognize word problems with insufficient information.	7-10	164-165
PS7	Solve problems involving the reading and interpretation of graphs.	8-10	188-189
PS8	Use estimation to choose reasonable solutions to word problems.	9-10	212-213
PS9	Solve problems involving diagrams.	10-10	236-237
PS10	Solve two-step problems.	11-10	260-261
PS11	Estimate answers in solving measurement problems.	12-4	272-273
PS12	Solve problems involving time and money.	12-10	284-285
PS13	Solve problems involving factors and multiples.	13-10	308-309
PS14	Solve problems involving fractions and decimals.	14-8	328-329

Student Record Chart

for Pretests, Book Tests, and Post-tests

Numeration

N1						
N2						
N3						
N4						
N5						
N6						
N7						
N8						
N9						
N10						
N11						
N12						
N13						
N14						
N15						
N16						
N17						
N18						
N19†						
N20						
N21†						
N22						
N23†						

Arithmetic

A1						
A2						
A3						
A4						
A5						
A6						
A7						
A8						
A9						
A10						
A11						
A12						
A13						
A14						
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A56						
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A58						
A59						
A60						
A61						
A62						
A63						
A64						

Measurement

M1						
M2						
M3						
M4						
M5						
M6						
M7						
M8						
M9						
M10						
M11						
M12						
M13						
M15						
M16						
M17						
M18						

Geometry

G1						
G2						
G3						
G4						
G5						
G6						
G7						
G8						
G9						
G10						
G11						
G12						

Graphing

GR1						
GR2						
GR3						
GR4						
GR5						
GR6						
GR7						
GR8						

† Two questions per box.

Scope & Sequence

4

5

6

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UNIT 1

Numeration

Theme: The Hardware Store

Lesson	Objective		Pages
Preview		Read and write three-digit numerals.	1
1	N1	Extend the numeration system to hundred thousands.	2-3
2	N2	Extend the numeration system to hundred millions.	4-5
3	N3	Compare numbers using $<$, $=$, or $>$.	6-7
4	N4	Round to the nearest ten, hundred, thousand, or ten thousand.	8-9
5	N5	Write tenths using decimal notation.	10-11
6	N6	Write hundredths using decimal notation.	12-13
7	N7	Write decimals equal to or greater than 1.	14-15
8	N8	Compare decimals using $<$, $=$, or $>$.	16-17
9	N9	Annex zeros to compare decimals.	18-19
10	N10	Round decimals to the nearest whole number.	20-21
11	PS1	Read and interpret charts to solve problems involving the comparison and ordering of related facts.	22
Test		Numeration	23

About This Unit

The aim of this unit is:

1. to develop skills with place value in numbers from hundred millions to hundredths;
2. to develop skills in rounding numbers to the nearest whole number, ten, hundred, thousand, and ten thousand;
3. to develop skills in comparing whole numbers and decimal numbers;
4. to develop skills in using information given in chart form.

The instructional strategy is to present the base ten numeration system, step by step, from ones to hundred millions, and then from ones to hundredths. This knowledge of place value is used not only in understanding our base ten number system, but also in rounding numbers, in comparing numbers, and in interpreting information presented in charts.

In this unit, the students will learn to write whole numbers in standard form, expanded form, and in words. Familiarity with terms such as *greater than*, *less than*, *equals*, *one more*, *one less*, *next larger*, *next smaller*, *between*, and *in order* will be the result of the two comparison lessons and of place-value lessons. The three decimal lessons should equip the students to read and write decimals in tenths and hundredths from pictorial models, fraction equivalents, and words. The students will also be able to apply their knowledge of decimals to the metric system and to change centimetres to decimetres or metres.

The lessons are arranged in a developmental sequence. It is important for the students to understand the principles of the base ten numeration system, since it provides a foundation for the remaining lessons of the book.

It is important that place-value concepts be introduced with concrete materials. The teacher's instructions for each lesson provide suggestions, such as place-value number blocks, a place-value pocket holder, or a place-value abacus. Some students may need to work with these kinds of manipulatives longer than others before complete understanding of the concepts is reached.

Throughout this book, the words *number* and *numeral* are used properly where the distinction is clear. A *numeral* is a written symbol for a *number*. The word *number* is used when the distinction is vague. For example, in comparing numbers, the

process involves examining the digits of the numerals, however, as a comparison of quantities is involved, we still speak of the "comparison of 2-digit numbers". It is wise not to make too much of this distinction with the students, but to use the words properly whenever the distinction is clear.

Ideas

The theme of this unit (*Hardware Store*) may be used to create a bulletin board display. Ask the children to find brochures, advertisements, or other printed or pictorial material where numbers are used in a hardware store. Some examples are sizes of tools such as wrenches, sizes of nails and screws, building materials in various lengths and widths, tiles, windows, and many more. Metric sizes are preferred but allow all examples that the children contribute. As you proceed through the lessons in this unit, have the children use the bulletin board display to find examples related to each lesson.

UNIT 1

NUMERATION



Unit 1 Objective	Test Questions	Pages
N1	1-7, 12	2-3
N2	4, 5, 8-11	4-5
N3	13, 14	6-7
N4	15-17	8-9
N5	18	10-11
N6	19	12-13
N7	20-22	14-15
N8	24	16-17
N9	23, 25	18-19
N10	26-28	20-21

Pretest

Unit 1

Write in expanded form.

1. 7029 $70\,000 + 8\,000 + 100 + 20 + 4$

2. 78 124

3. 509 203 $500\,000 + 9\,000 + 200 + 3$

4. 6 720 503 $6\,000\,000 + 700\,000 + 20\,000 + 500 + 3$

Write in standard form.

5. 742 190 006 $700\,000\,000 + 40\,000\,000 + 2\,000\,000 + 100\,000 + 90\,000 + 6$

6. $800\,000 + 40\,000 + 7000 + 900 + 7 = 847\,907$

7. $30\,000 + 8000 + 20 + 5 = 38\,025$

8. $90\,000\,000 + 3\,000\,000 + 40\,000 + 600 + 10 = 93\,040\,610$

9. five million five thousand five = $5\,005\,005$

10. three hundred ninety-five million three hundred ninety-five =

$395\,000\,395$

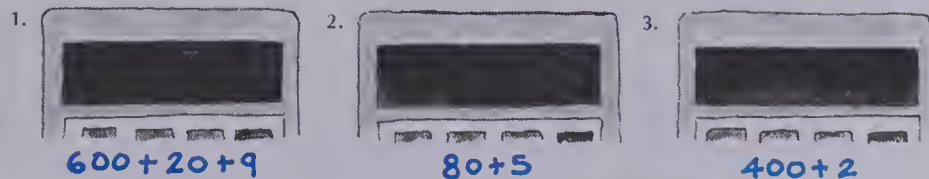
Write the place value of the underlined digit.

11. 240 137 826 40 000 000

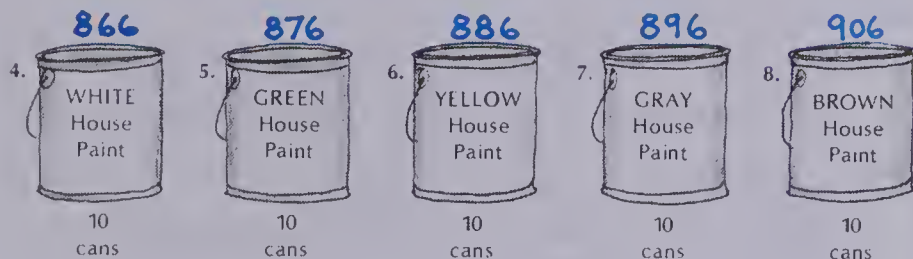
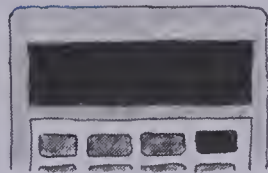
12. 519 778 249 700 000

Taking Stock

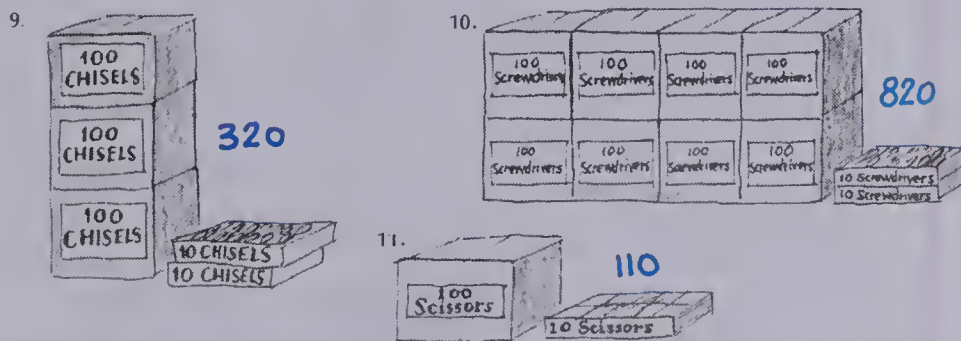
Jim is taking stock in the hardware store. He entered the following numbers on his calculator. Write the numbers in expanded form.



Jim counted 856 cans of paint. Then he counted the cans on another shelf. Write the numbers that appeared on the calculator as he added each number.



Write the total for each kind of tool.

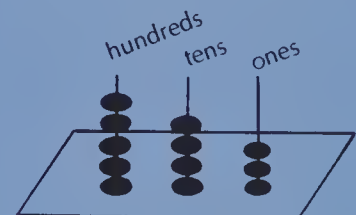


UNIT 1

PREVIEW

Suggestions

Use the picture of inventory being taken at the hardware store to initiate discussion of three-digit numerals. Write the inventory count for one item (for example, 543) on the chalkboard. Explain that this is called the *standard form* of the number. Discuss the names of each of the places. Show each place with an abacus. (An abacus can be made with a coat hanger, beads, and a board; or it can be drawn on the chalkboard.)



5 hundreds or 500
4 tens or 40
3 ones or 3
543

Point out that the addition, $500 + 40 + 3$, is the *expanded form* of the number. Explain that it is the sum of all of the place values.

Use the other three-digit numerals in the picture of the hardware store inventory to continue the discussion of place value. To elicit different responses from the students:

1. write a numeral in standard form and ask the students to write it in expanded form;
2. write a numeral in expanded form and ask the students to write it in standard form;
3. say a numeral and ask that it be written in standard and in expanded form;
4. write a numeral and ask that the students read it properly; make sure that they do not use the word "and".

About the Page

All students should be able to do the review exercises on page 1. Read and discuss the three kinds of directions on the page. The first three questions require the writing of numbers in expanded form. Questions 4 to 8 involve counting by tens from 856. If possible, have calculators available to illustrate the problem or to check responses. Questions 9 to 11 involve interpreting a place-value drawing and writing numbers in standard form.

Complete, using $<$, $=$, or $>$.

13. $57\ 264$ **$>$** $56\ 388$ 14. $62\ 148\ 517$ **$<$** $62\ 148\ 571$

Round to the nearest ten, to the nearest hundred, and to the nearest thousand

15. 3524 **3520** 16. $56\ 125$ **56\ 130** 17. $940\ 876$ **940\ 880**
3500 **56\ 100** **940\ 900**
4000 **56\ 000** **941\ 000**

Write the decimal.

18. one tenth = **0.1** 19. one hundredth = **0.01**
20. twelve and nine hundredths = **12.09**
21. $\frac{35}{10}$ = **3.5** 22. $\frac{236}{100}$ = **2.36**

Complete. Use $<$, $=$, or $>$

23. $84\ 5$ **$<$** $85\ 4$ 24. $2\ 68$ **$<$** $2\ 99$ 25. $3\ 2$ **$>$** $3\ 02$

Round to the nearest whole number

26. $56\ 7$ **57.0** 27. $780\ 53$ **781.00** 28. $9\ 19$ **9.00**

Objective N1

Extend the numeration system to hundred thousands.

Introducing the Lesson

Begin a discussion of the *base ten* number system. Ask the students to name the *ten* digits in this system. Show, too, how the value of each place is *ten times* greater than the value of the place to its right.

Teaching the Lesson

Read and discuss the lesson example on the top of page 2. Focus attention on the six-digit numeral, 573 182, beginning with the *names* and *values* of the six places. Show how the pattern pointed out earlier continues (each place is ten times greater than the place to its right).

Have the students look for other patterns, for example, 10 multiplied by itself 5 times is 100 000 and 100 000 has 5 zeros.

Write 573 182 on the chalkboard. Recall that this is the *standard form* of the numeral. Explain that the six digits are grouped in threes for ease and convenience in reading and writing large numbers. Note that the thousands family (one thousand, ten thousand, and hundred thousand) and the ones family (ones, tens, hundreds) are grouped together.

Using an abacus or a place-value pocket holder, illustrate 573 182. Discuss the place values of each of the digits and then write the number in *expanded form*.

$$500\,000 + 70\,000 + 3\,000 + 100 + 80 + 2$$

Point out the proper way to read the number as shown on page 2. Note that there is a pause between saying the thousands family and the ones family, but that the word "and" is not said.

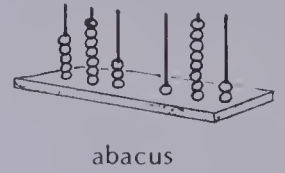
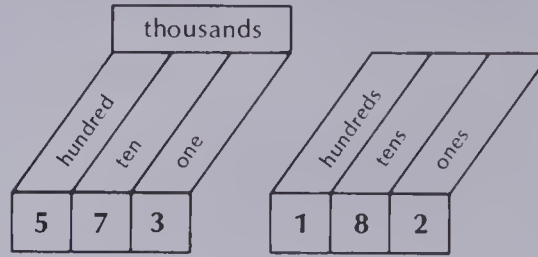
List several four-, five-, and six-digit numerals on the chalkboard. Ask the students to show them on an abacus or a pocket holder, to write them in expanded form, and, finally, to read them properly.

Using the list of numerals on the chalkboard, ask the students to determine, write, and say the next larger number.

Thousands



Mr. Logan noted in his inventory that he had 573 182 cut boards.



Expanded form: $500\,000 + 70\,000 + 3\,000 + 100 + 80 + 2$

Standard form: 573 182

Words: five hundred seventy-three thousand one hundred eighty-two

EXERCISES

Write in standard form.

1. $50\,000 + 3\,000 + 900 + 60 + 4$ **53 964**
2. $400\,000 + 80\,000 + 2\,000 + 100 + 50 + 9$ **482 159**
3. $3\,000 + 40 + 7$ **3047**
4. $900\,000 + 6\,000 + 10 + 3$ **906 013**
5. twenty-five thousand three **25 003**
6. eight hundred fifty-six thousand four hundred sixteen **856 416**
7. seven hundred seven thousand two hundred two **707 202**

Write in expanded form.

8. 187 245 **$100\,000 + 80\,000 + 7\,000 + 200 + 40 + 5$**
9. 1047 **$1\,000 + 40 + 7$**
10. 693 182 **$600\,000 + 90\,000 + 3\,000 + 100 + 80 + 2$**
11. 50 204 **$50\,000 + 200 + 4$**

Write the place value of the underlined digit.

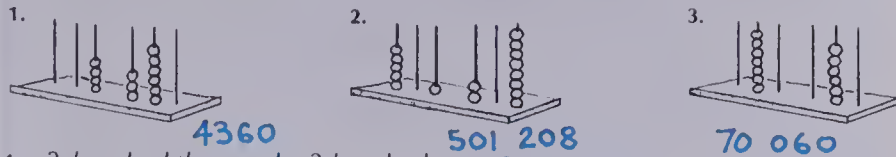
12. 493 216 **thousands**
13. 858 7 24 **hundreds**
14. 501 2 67 **tens**
15. 6 50 349 **ten thousands**
16. 2 65 498 **hundred thousands**
17. 794 851 **ones**

Using the Exercises

- Questions 1 to 7 require that numerals be written in standard form from expanded forms or words. Check that the students can properly place zeros in the standard form:
3. $3\,000 + 40 + 7 = 3047$
5. twenty-five thousand three = 25 003
- An understanding of place value is required in questions 8 to 11 as the students write the expanded form of the number.
- Questions 12 to 17 ask the students to give place values of specific digits.

PRACTICE

Write in standard form.



4. 2 hundred thousands, 2 hundreds **200 200**
5. 7 ten thousands, 6 thousands, 5 tens **76 050**
6. $300\ 000 + 90\ 000 + 4000 + 600 + 20 + 5$ **394 625**
7. $8000 + 70 + 1$ **8071**
8. $50\ 000 + 200 + 8$ **50 208**
9. $700\ 000 + 60\ 000 + 500 + 90$ **760 590**
10. six hundred twenty-two thousand eight hundred thirteen **622 813**
11. one thousand seven hundred forty-five **1745**
12. thirty thousand nine **30 009**
13. four hundred thousand five hundred **400 500**
14. eighty thousand two hundred seven **80 207**

Write the next five numerals.

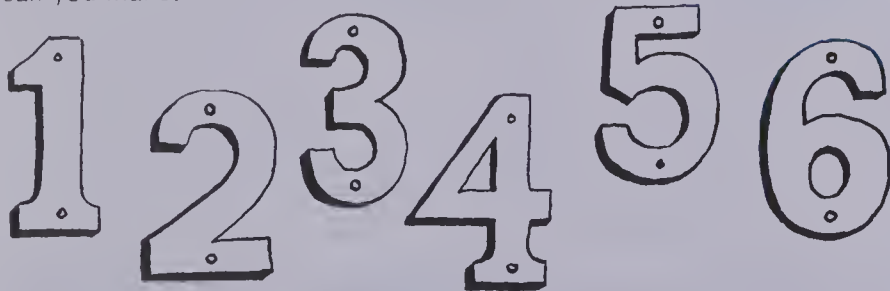
15. 79 149 **79 150, etc.**
16. 4000 **4001, etc.**
17. 999 990 **999 991, etc.**
18. 9999 **10 000, etc.**

Number Fun

Make six-digit numerals that have a 1 in the hundred thousands place. Use the digits below. In each numeral, use each digit only once. How many different numerals can you make?

For example,

123 456
123 465
123 645
123 654



3

Assigning the Practice

Minimum: even numbers

Average: all

Enriched: all

Reinforcement

1. Divide the students into two groups. One group will calculate mentally; the other group will check the answers with calculators. Write a large number, such as 45 284, on the chalkboard and ask the students to subtract 5000. Call for the answer first from someone who calculated it mentally, then from someone who used a calculator. Continue with other large numbers, discussing place value with each calculation. Have the students take turns with the calculators.

2. Give the students worksheets with several abacuses drawn on them.



Write a set of numbers in words on the chalkboard. Ask the students to show the numbers on the abacuses.

3. Make an overhead transparency of a 6×6 grid. In 18 squares write large numbers in standard form. In the remaining 18, write the same numbers in expanded form. Prepare a set of 36 blank cards, each the size of a grid square. Use them to cover all the squares. Play a class game of "Concentration". Divide the class into two teams. Ask a student from one of the teams to turn over two cards. If the uncovered numbers match, the cards are kept by the team. If they do not match, the cards are put back. The teams take turns. The team with the most cards at the end of the game wins.

Enrichment

1. Assign *Number Fun* at the bottom of page 3. Better-than-average students will find this activity challenging. When correct solutions have been found, have the students explain their methods.

2. Have the students write poems or make up puzzles about large numbers.

Extra Practice

Worksheet N1

Pages 2-3

What is the place value of the 8?

1. 485 214 **80 000**
2. 308 976 **8000**
3. 800 562 **800 000**
4. 79 812 **800**
5. 5168 **8**
6. 376 489 **80**

Write in standard form.

7. $60\ 000 + 200 + 1 =$ **60 201**
8. $800\ 000 + 5000 + 30 + 7 =$ **805 037**
9. $100\ 000 + 90\ 000 + 3 =$ **190 003**
10. three hundred thirty thousand five hundred two = **330 502**
11. eighty-nine thousand five = **89 005**
12. seven hundred six thousand forty-nine = **706 049**

Objective N2

Extend the numeration system to hundred millions.

Introducing the Lesson

Play this game to stress place value with numbers up to 999 999. Prepare a class set of cards similar to the following.

My number is
485 231.
Whose number
has 2 thousands
and 17 tens?

My number is
2170.
Whose number
has 6 digits and
has 5s in the tens
and ones places?

A card is given to each class member. One person starts by reading the question on his or her card. The person whose number answers that description responds and then reads the question on his or her card.

Teaching the Lesson

Introduce the **millions** by directing attention to page 4. Discuss the new group (or family) of three places (one million, ten million, and hundred million) as shown on the chart. Show the relationship of millions to the other places, pointing out that each place is 10 times greater than the one to its right.

10 000 000s	1 000 000s	100 000s
$10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$	$10 \times 10 \times 10 \times 10 \times 10 \times 10$	$10 \times 10 \times 10 \times 10 \times 10$

Have the students note the zero patterns: a million is six 10s multiplied and has six zeros.

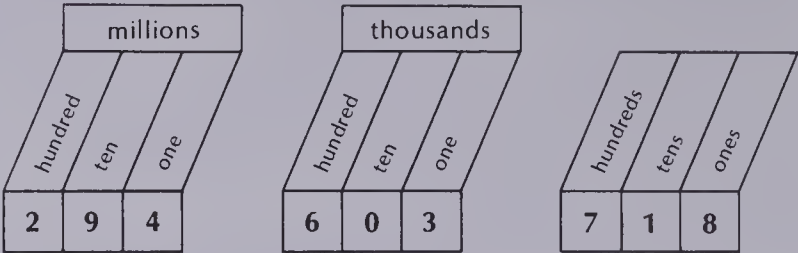
Write the numeral 294 603 718 on the chalkboard. Discuss the *value* of each place as a student shows the number on an abacus or a place-value pocket holder. Ask another student to write the number in expanded form as each place is discussed.

Write several seven-, eight-, and nine-digit numerals on the chalkboard. Ask the students to show them on an abacus or a place-value pocket holder, write them in expanded form, and read them properly.

Millions



Can you help Mr. Logan read this number?



Expanded form: 200 000 000 + 90 000 000 + 4 000 000 + 600 000 + 00 000 + 3000 + 700 + 10 + 8

Standard form: 294 603 718

Words: two hundred ninety-four million six hundred three thousand seven hundred eighteen

EXERCISES

What is the place value of the 5? **ten thousands** **hundred millions**

1. 5 762 138 **millions** 2. 18 057 923 3. 511 692 404

4. 26 834 519 **hundreds** 5. 350 274 196 **ten millions** 6. 8 560 301 **hundred thousands**

What is the next whole number?

7. 70 000 **70 001** 8. 659 498 **659 499** 9. 7 000 999 **7 001 000**

10. 46 327 999 **46 328 000** 11. 342 129 999 **342 130 000** 12. 156 999 999 **157 000 000**

Write in standard form.

13. six million **6 000 000**

14. eight hundred twenty-five million one hundred eighteen thousand two hundred seventy-three **825 118 273**

15. seventy-six million three hundred nine thousand fifty-seven **76 309 057**

16. **17 013 005** 17. **401 020 713** **76 309 057**

Using the Exercises

- Questions 1 to 6 require the student to determine the place value of a specific digit. Students should first notice that all the numerals do not have the same numbers of digits.
- Questions 7 to 12 require that the next larger number be written. In many cases more than the ones place needs changing.
- In questions 13 to 17 numbers must be written in standard form from words and from abacus models. Be sure that the students can determine where to put zeros in the numbers.

PRACTICE

Write in standard form.

- $10\,000\,000 + 3\,000\,000 + 600\,000 + 20\,000 + 8000 + 500 + 70 + 4$ **13 628 574**
- $400\,000\,000 + 600\,000 + 20\,000 + 900 + 10 + 5$ **400 620 915**
- $5\,000\,000 + 70\,000 + 8000 + 200$ **5 078 200**

4.  **704 050 432**

5.  **24 100 101**

- twelve million **12 000 000**
- two million five hundred **2 000 500**
- seventy-seven million **77 000 000**
- three hundred two thousand **302 000**
- four hundred forty-five million **445 000 000**
- eleven million eleven thousand **11 011 000**

What is the next larger number?

- 307 999 **308 000**
- 7 999 999 **8 000 000**
- 342 129 999 **342 130 000**

Write in expanded form.

- 41 783
- 9 000 000
- 374 630 215
- 13 090 802
- 521 000 234
- 24 851 367

- Write the largest nine-digit number possible, using all of the digits from 1 to 9 only once. **9 87 654 321**

Lonk's Logic

Lonk, a visitor from Pluto, wrote these sentences in a base ten number system. He used *his* symbols for our digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. Rewrite the sentences in our digits.

$$\begin{aligned} 6 + 6 &= 12 \\ \Delta + \Delta &= 50 \\ * + 3 &= 12 \\ 5 - 1 &= 5 \\ 2 + 4 &= 6 \\ 0 + 0 &= \Delta \\ 3 + 5 &= * \end{aligned}$$

$$\begin{aligned} \Delta &= 6 \\ 50 - 4 &= 7 \\ 50 - 8 &= 9 \\ 7 - 6 &= 5 \\ 50 - 5 &= 5 \end{aligned}$$

5

Assigning the Practice

Minimum: even numbers

Average: all

Enriched: all

Reinforcement

1. Play a dice game to emphasize place value. Two players (or two teams) play against each other. Two dice and a piece of paper are needed. Each player (or team) begins a turn by making nine blanks (— — — — —) on the paper and then rolling the dice nine times. With each roll, the numbers on the dice are added and the resulting number is put in any of the blanks (if a two-digit number is obtained, add the digits: $10 \rightarrow 1$, $11 \rightarrow 2$, $12 \rightarrow 3$). Each player tries to make the largest number possible in nine throws. The player with the largest number wins. Several rounds may be played.

2. To understand the concept of *one million* better, conduct a class project to draw one million dots. Prepare 100 worksheets with a 10×10 grid of squares $2\text{ cm} \times 2\text{ cm}$. Ask the students to make a 10×10 array of dots (100 dots) in each square (10 000 dots per worksheet). Other classes might be asked to help with the project. The completed project should be displayed.

Enrichment

1. Assign *Lonk's Logic* at the bottom of page 5. The decoding of these symbols will require some basic numeration principles (identity element, doubles, etc.). Trial and error can be used to solve the problem. Logical analysis will be easier and more efficient.

2. Write four numbers on the chalkboard (e.g., 426, 1047, etc.). Give the students calculators and ask them to multiply the numbers by 10, 100, and 1000. Have them list their answers on paper in chart form. Ask the students to write a rule for each multiplication. When this is completed, follow a similar procedure for division by 10, 100, and 1000. (For division, use numbers in the millions.)

3. Obtain a Chinese abacus and have the students learn how to use it.

Extra Practice

In the numeral 273 480 915,

- the 7 is in the ten millions place.
- the 8 is in the ten thousands place.
- the 2 is in the hundred millions place.
- the 9 is in the hundreds place.
- the 3 is in the millions place.

Write in standard form.

- $400\,000\,000 + 7\,000\,000 + 7000 =$ **407 007 000**
- $20\,000\,000 + 500\,000 + 30 + 5 =$ **20 500 035**
- $900\,000\,000 + 60\,000 + 500 + 7 =$ **900 060 507**
- thirty-two million one hundred nine thousand = **32 109 000**
- four hundred six million eleven thousand three = **406 011 003**

Worksheet N2

Pages 4-5

Objective N3

Compare numbers using $<$, $=$, or $>$.

Introducing the Lesson

Write 92 and 67 on the chalkboard and ask the students to compare the numbers in various ways. After a while they should point out that 92 has more tens than 67, so 92 is larger than 67. Encourage the use of the words *greater than* and *less than* and write these on the board along with the symbols $>$ and $<$. Have the students devise the comparison statements: $92 > 67$ and $67 < 92$. Some students may benefit from learning a way to help them distinguish the symbols.



The mouth always opens toward the *larger* number.

$$67 < 92$$

Teaching the Lesson

On the chalkboard, make a place-value chart to compare the numbers 521 and 392. Explain that when comparing numbers one always starts with the largest place the numbers have, that is, the digits farthest to the left.

1000s	100s	10s	1s	
	5	2	1	500 > 300
	3	9	2	so, 521 > 392

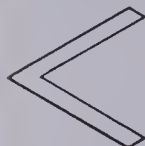
Then compare the numbers 473 and 439. Have the students notice that since the numbers in the hundreds place are the same, they must compare the tens.

1000s	100s	10s	1s	
	4	7	3	400 = 400
	4	3	9	70 > 30
				so, 473 > 439

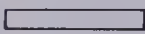
Point out the numbers to be compared at the top of page 6. Read and discuss the comparison steps.

7000 = 7000 Compare thousands.
300 = 300 Compare hundreds.
40 > 10 Compare tens.
so, 7342 > 7318

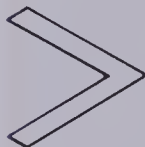
Comparing Numbers



is less than



equals



is greater than

thousands	hundreds	tens	ones
7	3	4	2

thousands	hundreds	tens	ones
7	3	1	8

Compare the thousands: 7000 = 7000

(They are equal, so compare the digits in the next place.)

Compare the hundreds: 300 = 300

(They are equal, so compare the digits in the next place.)

Compare the tens: 40 > 10

$$7342 > 7318$$

EXERCISES

Copy and complete. Use $<$, $=$, or $>$.

- 29 \blacksquare 21 $>$
- 700 \blacksquare 300 $>$
- 641 \blacksquare 638 $>$
- 98 \blacksquare 101 $<$
- 475 \blacksquare 461 $>$
- 4000 \blacksquare 7000 $<$
- 6413 \blacksquare 6397 $>$
- 5426 \blacksquare 5612 $<$
- 97 128 \blacksquare 97 200 $<$
- 47 103 926 \blacksquare 8 965 979 $>$
- 9 173 402 \blacksquare 9 173 410 $<$

What are the whole numbers between:

- 98 and 103? **99, 100, 101, 102**
- 9999 and 10 004? **10 000, etc.**
- 50 505 and 50 515? **50 506, etc.**
- 700 008 and 700 012? **700 009, 700 010, 700, 011**

What whole number precedes each number?

- 500 **499**
- 999 **998**
- 6201 **6200**
- 58 780 **58 779**
- 103 310 **103 309**
- 8 000 000 **7 999 999**

Rearrange each *less than* statement to make a *greater than* statement.

- 473 < 483 **483 > 473**
- 999 < 1003 **1003 > 999**
- 8452 < 8542 **8542 > 8452**

Using the Exercises

- Questions 1 to 11 require the students to write comparison statements using the correct signs. Do some orally; concentrate on the questions involving large numbers.
- See that the students name *only* the between numbers in questions 12 to 15. The numbers between 98 and 103 are 99, 100, 101, and 102.
- Questions 16 to 21 require that the next smaller number be written. In some cases, several digits change.
- For questions 22 to 24, students must use the $>$ symbol and rearrange the numbers in each comparison statement.

PRACTICE

Write in order from smallest to largest.

- 399, 397, 404, 399, 401, 398, 404, 1101, 1011, 1101, 1110, 1001
- 52 555, 55, 255, 25, 555, 3333, 33 333, 333, 33

Copy and complete. Use $<$, $=$, or $>$.

- 630 \blacksquare 603 $>$
- 7556 \blacksquare 7665 $<$
- 54 461 \blacksquare 54 614 $<$
- 143 000 \blacksquare 142 800 $>$
- 6254 \blacksquare 6245 $>$
- 11 212 \blacksquare 11 121 $>$
- 7 999 999 \blacksquare 7 909 999 $>$
- 8 080 808 \blacksquare 8 180 808 $<$

What number is 1 less than each number?

- 6201 6200
- 8 00 000 $799 999$
- 5000 4999
- 7 000 060 $7 000 059$

What are the whole numbers between:

- 1000 and 1003? $1001, 1002$
- 80 809 and 80 812? $80 810, 80 811$
- 999 999 and 1 000 002? $1 000 000, 1 000 001$
- 900 008 and 900 011? $900 009, 900 010$

Rearrange each greater than statement to make a less than statement.

- 4893 $>$ 4873 $4873 < 4893$
- 6579 $>$ 6570 $6570 < 6579$
- 900 000 $>$ 899 999 $899 999 < 900 000$
- 6 125 417 $>$ 6 125 407 $6 125 407 < 6 125 417$

File It!

Simone's summer job was to file invoices by number. Write the letter of the drawer in which each invoice should be filed.

J	K	L	M
98 001—98 250	98 251—98 550	98 551—98 750	98 751—99 000

Invoice 98 305 K	Invoice 98 999 M	Invoice 98 449 K	Invoice 98 749 L
Invoice 98 904 M	Invoice 98 620 L	Invoice 98 046 J	Invoice 98 249 J

7

Assigning the Practice

Minimum: odd numbers

Average: all

Enriched: all

Reinforcement

1. Assign *File It!* at the bottom of page 7. All students should be able to do this exercise successfully.

2. Give each student a piece of stiff paper. Ask the students to fold and cut the paper into 4 rectangles. Have the students write a six-digit numeral on one rectangle, and seven-, eight-, and nine-digit numerals on the other rectangles. Collect the numeral cards according to size. Use these cards for the following comparison activities:

- ordering numbers;
- finding numbers that come between two given numbers;
- writing comparison statements about two numbers.

Enrichment

Prepare a computation worksheet similar to the list here. Ask students to compare the amounts using $<$, $=$, or $>$.

- $48 + 20$ \bullet $95 - 20$
- 90×2 \bullet $500 - 300$
- 9×8 \bullet $84 - 12$
- 7×7 \bullet 12×4
- $90 - 40$ \bullet 8×8
- 4×8 \bullet $28 + 4$
- $150 \div 3$ \bullet 6×9
- $781 - 300$ \bullet $200 + 280$
- 6×6 \bullet $21 + 15$
- $500 + 90$ \bullet $1000 - 400$

Extra Practice

Worksheet N3

Pages 6-7

Complete using $<$, $=$, or $>$.

- 7521 $<$ 7531
- 9009 $<$ 9010
- 62 173 $>$ 62 163
- 50 427 $<$ 51 987
- 8641 $>$ 8639
- 267 875 $>$ 267 874

Rearrange each less than statement to make a greater than statement.

- 7521 $<$ 7531 $7531 > 7521$
- 999 $<$ 1000 $1000 > 999$
- 9009 $<$ 9010 $9010 > 9009$
- 50 427 $<$ 51 987 $51 987 > 50 427$
- Write all the even numbers that are greater than 58 243, but less than 58 255. $58 244, 58 246, 58 248, 58 250, 58 252, 58 254$

Objective N4

Round to the nearest ten, hundred, thousand, or ten thousand.

Introducing the Lesson

Read and talk about the paragraph at the top of page 8 as a springboard to discussing the difference between *rounded* numbers and exact numbers. Have the students distinguish between the appearance of a rounded number and that of an exact number.

473 exact
500 rounded

The rounded number has zeros. Discuss, too, the uses of rounded numbers. Have the students mention the occasions when they might need a rounded number and the occasions when they would rather have an exact number.

Teaching the Lesson

Explain how the exact number, 872, in the lesson example is **rounded up** to 900 on the number line. Show that when rounding to the *nearest hundred*, 872 is closer to 900 than to 800 and thus *rounds up* to 900.

Point out that the number 812 would **round down** to 800, since it is closer to 800. Show how the number 850 comes exactly between 800 and 900 on the number line. Explain that when this happens, the convention (tradition, agreed-upon rule) is to **round the number up**. In this case, 850 rounds up to 900.

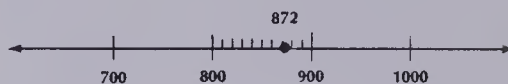
Show the class how to round numbers to the nearest ten, hundred, thousand, or ten thousand without a number line.

For example, when rounding 813 769 to the nearest ten thousand, have each student point a pencil to the number in the ten thousands place. Explain that this number will either remain the same or increase by one, depending on the number to its right. If the number to the right is 5 or more, it increases by one and all numbers to the right become zeros. If the number to the right is less than 5, it stays the same and all numbers to the right become zeros.

Rounding

On Saturday, Mr. Logan sold \$862 worth of tools. He sold about \$900 worth.

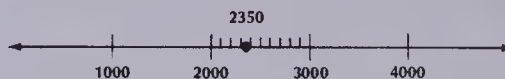
To the nearest hundred, 872 **rounds** to 900.



872 is closer to 900 than to 800.

Mr. Zalewski used 2350 m of fencing.

To the nearest thousand, 2350 **rounds** to 2000.



2350 is closer to 2000 than to 3000.



EXERCISES

Round to the nearest ten.

- | | | | |
|-------------------|---------------------|------------------|-------------------|
| 1. 33 30 | 2. 61 60 | 3. 92 90 | 4. 74 70 |
| 5. 169 170 | 6. 1207 1210 | 7. 95 100 | 8. 105 110 |

Round to the nearest hundred.

- | | | | |
|--------------------|----------------------|----------------------|--------------------------|
| 9. 431 400 | 10. 786 800 | 11. 150 200 | 12. 111 100 |
| 13. 499 500 | 14. 2195 2200 | 15. 1895 1900 | 16. 15 564 15 600 |

Round to the nearest thousand.

- | | | | |
|----------------------|------------------------|--------------------------|----------------------------|
| 17. 5617 6000 | 18. 5312 5000 | 19. 6875 7000 | 20. 9499 9000 |
| 21. 8539 9000 | 22. 9994 10 000 | 23. 17 500 18 000 | 24. 604 604 605 000 |

Round to the nearest ten thousand.

- | | | | |
|----------------------------|--------------------------|----------------------------|--------------------------------|
| 25. 91 764 90 000 | 26. 38 529 40 000 | 27. 175 408 180 000 | 28. 652 196 650 000 |
| 29. 785 176 790 000 | 30. 9999 10 000 | 31. 678 126 680 000 | 32. 6 590 316 6 590 000 |

Using the Exercises

- Questions 1 to 32 give practice in rounding to the nearest ten, hundred, thousand, and ten thousand. The first few examples in each group should be done as a class and discussed. Note that the first few numbers in each group have a bold digit. This has been done to help the students find the place to which the number must be rounded.

PRACTICE

Write the letter of the matching number. The answers have a message.

- 92 845 rounded to the nearest ten.
- 359 056 rounded to the nearest ten.
- 6 092 853 rounded to the nearest ten.
- 71 845 rounded to the nearest thousand.
- 439 056 rounded to the nearest thousand.
- 92 845 rounded to the nearest thousand.
- 359 056 rounded to the nearest hundred.
- 6 092 853 rounded to the nearest hundred.
- 71 845 rounded to the nearest hundred.

W
O
N
D
E
R
F
U
L

- | | |
|----|-----------|
| O. | 359 060 |
| R. | 93 000 |
| D. | 72 000 |
| L. | 71 800 |
| F. | 359 100 |
| W. | 92 850 |
| E. | 439 000 |
| U. | 6 092 900 |
| N. | 6 092 850 |

Write *ten*, *hundred*, or *thousand*.

- 25 475 rounded to the nearest \blacksquare is 25 500.
- 9065 rounded to the nearest \blacksquare is 9070.
- 201 132 rounded to the nearest \blacksquare is 201 000.

hundred
ten
thousand

Round each to the nearest 10 000.

- 67 321 70 000
- 82 964 80 000
- 45 311 50 000
- 284 990 280 000

REVIEW

Write in standard form.

- seven thousand seven 7007
- one hundred ninety-five thousand six hundred eleven 195 611
- $700\ 000 + 50\ 000 + 4000 + 6$ 754 006

Write the place value of the underlined digit.

- 5 6 52 103 hundred thousands
- 4 3 752 109 millions
- 3 9 702 134 ten millions
- 5 68 172 451 hundred millions

Copy and complete. Use $<$, $=$, or $>$.

- 1685 \blacksquare 1675 $>$
- 11 652 \blacksquare 11 652 $=$
- 1 372 115 \blacksquare 1 272 115 $>$
- 9999 \blacksquare 10 000 $<$

Round 51 375 to the nearest:

- ten 51 380
- hundred 51 400
- thousand 51 000
- ten thousand 50 000

9

Assigning the Practice

Minimum: 1-9, 13-16

Average: 1-16

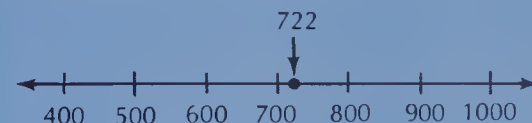
Enriched: 1-16

Review Exercises

Questions	Objective	Pages
1-3	N1	2-3
4-7	N2	4-5
8-11	N3	6-7
12-15	N4	8-9

Reinforcement

1. Put a number line marked into hundreds on the chalkboard and play the following rounding game. Divide the class into two teams. A member from one team locates a number of his or her choice on the number line and writes the number above it. A member from the other team tells what that number becomes when rounded to the nearest hundred.



Teams alternate. Each correct answer earns a point for the team.

2. Make a game board with a path of stickers going from Start to Finish. On each sticker write a numeral with 5, 6, 7, 8, or 9 digits. Take a blank die and write "hundreds", "thousands", and "ten thousands" on the faces (use each word twice). Do the same with the numbers 1, 2, and 3 on another die. Players roll the dice. The numbered die tells how many spaces to move. The other die tells to what place the sticker number is to be rounded. If the rounding answer is correct, the player may keep his or her marker there; otherwise the marker must be moved back to where it was. The first person to reach the finish wins.

Enrichment

Have the students use a map of Canada showing distance in kilometres. Ask them to make a chart listing places that are about 200 km, 500 km, 1000 km, 2000 km, etc. away from their locale. Display their findings.

Extra Practice

Round to the nearest ten.

- 43 40
- 85 90
- 796 800
- 937 940

Round to the nearest hundred.

- 642 600
- 155 200
- 6993 7000
- 12 846 12 800

Round to the nearest thousand.

- 6642 7000
- 8972 9000
- 17 276 17 000
- 107 356 107 000

Round to the nearest ten thousand.

- 17 694 20 000
- 32 943 30 000
- 19 985 20 000
- 438 155 440 000

Worksheet N4

Pages 8-9

- 169 170
- 1246 1250

- 5841 5800
- 105 791 105 800

- 13 857 14 000
- 792 801 793 000

- 409 682 410 000
- 135 613 140 000

Objective N5

Write tenths using decimal notation.

Introducing the Lesson

Discuss with the students what kind of numbers they have been using so far in this unit (whole numbers), and that sometimes they need to use numbers for amounts that are less than, or parts of, one whole. See if any students remember that these numbers are called **fractions** or **decimals**.

Point out the place-value chart at the top of page 10. Note where **tenths** are located on the chart. Explain that since ten tenths equal one, the ten-times-greater pattern of the base ten system, discussed in Lessons 1 and 2, continues.

Teaching the Lesson

Draw several figures on the chalkboard that represent amounts that are part of one whole. Ask the students to name the fractions.



Two of ten parts or $\frac{2}{10}$.



Three of ten spaces or $\frac{3}{10}$.

Point out how each is read in words and how each is written as a decimal.

$\frac{2}{10}$ two tenths 0.2

$\frac{3}{10}$ three tenths 0.3

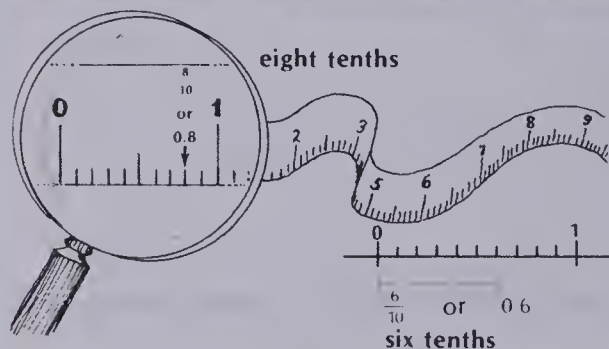
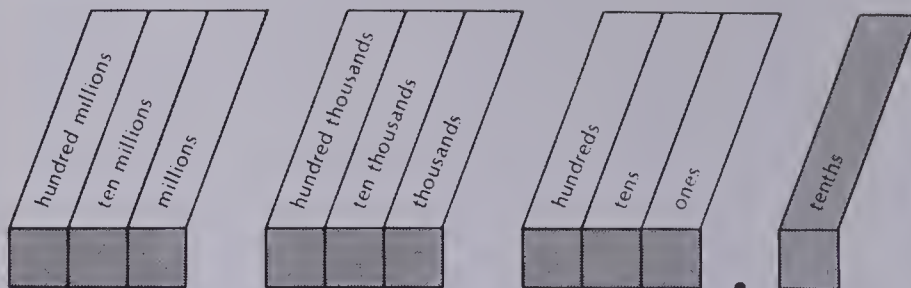
Mention that it is the custom to include the zero in the ones place (0.2, not .2), when indicating a decimal quantity less than, or part of, one whole.

Say an amount in tenths. Have a student draw a picture of it at the chalkboard and write it as a fraction, a decimal, and in words. Practise with several examples.

Give a centimetre ruler to each student. Review the length of a **centimetre** and of a **decimetre**. Have the students point to a decimetre length on their rulers. Ask the students to draw a 5 cm line segment. Point out that this is only part of a decimetre. Ask a student to determine what decimal part of a decimetre it is.

$$5 \text{ cm} = 0.5 \text{ dm}$$

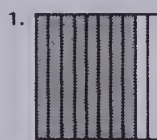
Tenths



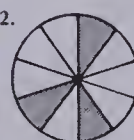
$\frac{4}{10}$ or 0.4
four tenths

EXERCISES

Write the decimal for the shaded part.



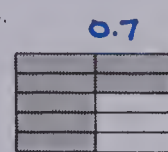
0.8



0.3



0.1



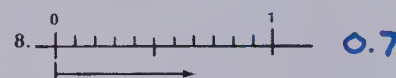
0.7

Write the decimal.

5. nine tenths 0.9

6. eight tenths 0.8

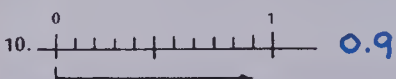
7. two tenths 0.2



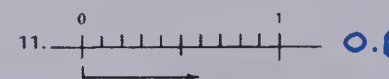
0.7



0.1



0.9





0.6

Using the Exercises

- Questions 1 to 11 require the student to write a decimal in tenths. The decimal is represented either by a picture or in words. Check that each decimal is written properly, including the zero in the ones place.

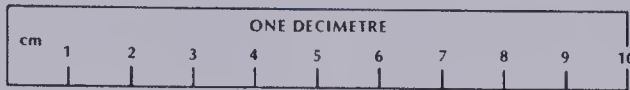
PRACTICE

Write the decimal.

1. 3 of 10 equal parts **0.3**
2. 1 of 10 equal parts **0.1**
3. $\frac{6}{10}$ **0.6**
4. $\frac{2}{10}$ **0.2**
5. $\frac{3}{10}$ **0.3**
6. $\frac{9}{10}$ **0.9**
7.  **0.8**
8.  **0.4**

1 dm = 10 cm

1 cm = 0.1 dm



How many decimetres? Write the decimal.

9. 3 cm **0.3 dm**
10. 8 cm **0.8 dm**
11. 5 cm **0.5 dm**
12. 6 cm **0.6 dm**

Use a ruler to draw a line segment the following length.

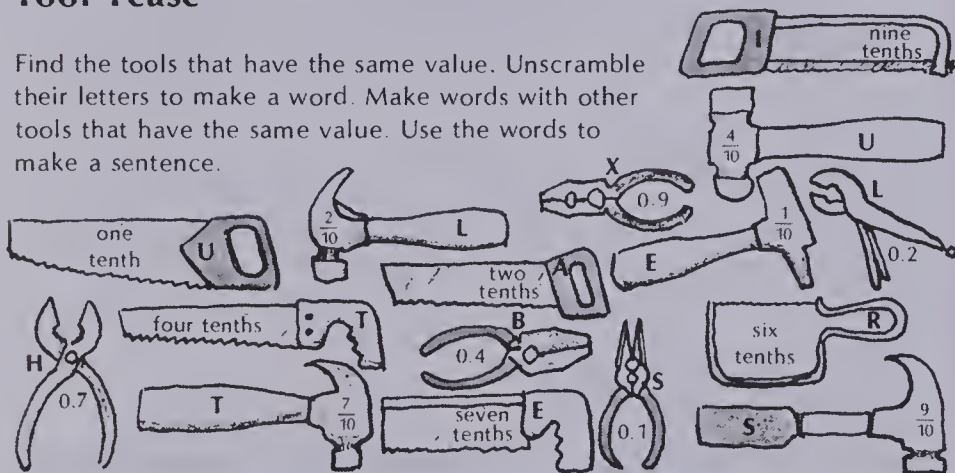
13. 0.2 dm
14. 0.7 dm
15. 0.5 dm
16. 0.9 dm

Write in words.

17. 0.1 **one tenth**
18. 0.8 **eight tenths**
19. 0.6 **six tenths**
20. 0.3 **three tenths**

Tool Tease

Find the tools that have the same value. Unscramble their letters to make a word. Make words with other tools that have the same value. Use the words to make a sentence.



USE ALL BUT THE R.

11

Assigning the Practice

Minimum: 1-8, 17-20

Average: 1-20

Enriched: 3-20

Reinforcement

1. Tool Tease at the bottom of page 11 can be assigned to all students. It provides practice in matching tenths written as fractions, as decimals, and in words.

2. Cut squared paper into strips of ten. Have the students colour in some of the squares and attach a decimal value to their illustration.



3. Prepare a worksheet of several different-sized line segments up to 10 cm long. Ask the students to measure each segment and write the measurement in centimetres and in decimetres.

 6 cm or 0.6 dm

Enrichment

Ask the students to make an arrangement of 10 centicubes of three, four, five, or six different colours. Have the students identify the number of cubes in each colour, according to the decimal value of the whole.



B	G	B	G
G	B	G	Y
Y	G		

3 blue
5 green
+ 2 yellow
10 cubes

0.3 of the figure is blue.
0.5 of the figure is green.
0.2 of the figure is yellow.

Extra Practice

Write the decimal.

1. $\frac{6}{10} =$ **0.6**
2. $\frac{1}{10} =$ **0.1**
3. $\frac{5}{10} =$ **0.5**
4. $\frac{8}{10} =$ **0.8**
5. seven tenths = **0.7**
6. two tenths = **0.2**
7.  = **0.6**
8.  = **0.3**

Write in words.

9. 0.5 **five tenths**
10. 0.7 **seven tenths**
11. 0.1 **one tenth**
12. 0.9 **nine tenths**

Use a ruler to draw a line segment.

13. 0.1 dm
14. 0.8 dm
15. 0.4 dm
16. 0.7 dm

Worksheet N5

Pages 10-11

UNIT 1 LESSON 6

Objective N6

Write hundredths using decimal notation.

Introducing the Lesson

Recall the places in the base ten number system studied so far with a chalkboard place-value chart. Point out how tens, ones, and tenths are similar to ten dollar bills, one dollar bills, and dimes.

3	4	6	\$3	4	6
tens	ones	tenths	ten dollars	one dollars	dimes

Ask for the name of the place that is similar to pennies: **hundredths**. Explain that one penny is *one hundredth* ($\frac{1}{100}$) of a dollar and it is written \$0.01. (Point out the need for the zero in the ones place: \$0.01.)

Teaching the Lesson

Give individual students handfuls of pennies. Have them count them and write on the chalkboard what fractional part of one dollar they are. Each should be written as a fraction and as a decimal in hundredths with the dollar sign. Ask other students to show the decimals on an abacus. Give out several amounts of pennies less than \$0.10 so that students have sufficient practice with showing and writing decimals in hundredths that have no tenths: \$0.04, \$0.09.

Place a 10 × 10 grid on an overhead projector. Cover some of the 100 squares and ask the students to write the number for the part covered as a fraction, as a decimal, and in words. Students with correct responses can take turns at the projector. Have some students also show these decimals with an abacus.

Give a metre stick to a small group of students and have them recall the lengths of 1 cm and 1 m. Review how many centimetres are in 1 m. Have the students draw a 15 cm line segment. Ask, "What part of 1 m is 15 cm?" *Fifteen hundredths*. Have them label the line segment in centimetres and metres.

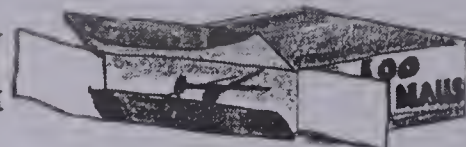
$$15 \text{ cm} = 0.15 \text{ m}$$

Ask the students to make and label several other line segments in centimetres and parts of a metre.

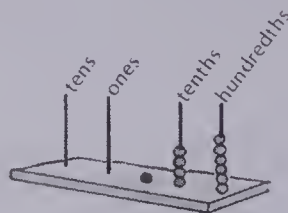
Hundredths



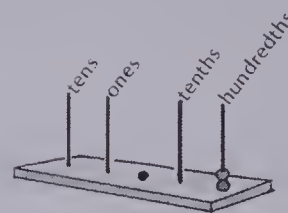
46 screws left
 $\frac{46}{100}$ or 0.46



2 nails left
 $\frac{2}{100}$ or 0.02



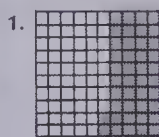
forty-six hundredths



two hundredths

EXERCISES

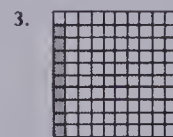
Write the decimal for the shaded part.



0.42

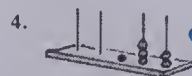


0.20

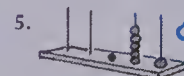


0.09

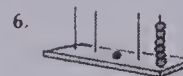
Write the decimal.



0.32



0.51



0.06

7. thirty-eight hundredths 0.38

8. forty-four hundredths 0.44

9. seven hundredths 0.07

10. two hundredths 0.02

11. $\frac{25}{100}$ 0.25

12. $\frac{4}{100}$ 0.04

13. $\frac{91}{100}$ 0.91

14. $\frac{12}{100}$ 0.12

Write each amount using numerals and \$.

15. seventy-two cents \$0.72

16. eight cents \$0.08

17. eighteen cents \$0.18

18. five cents \$0.05

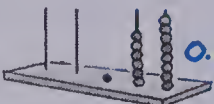
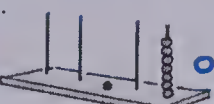

Using the Exercises

- Questions 1 to 14 give practice in writing a decimal in hundredths from a shaded grid, an abacus, words, and a fraction. Do some questions orally, particularly a few of those having no tenths, e.g., 0.09.
- Questions 15 to 18 require the students to apply decimal notation to writing amounts of money.

PRACTICE

Write the decimal.

1. $\frac{24}{100}$ **0.24** 2. $\frac{68}{100}$ **0.68** 3. $\frac{30}{100}$ **0.30** 4. $\frac{99}{100}$ **0.99**

5.  **0.68** 6.  **0.07** 7.  **0.13**

Write each amount using numerals and \$.

8. sixty-five cents **\$0.65** 9. thirty-two cents **\$0.32**
10. four cents **\$0.04** 11. one cent **\$0.01**

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ cm} = 0.01 \text{ m}$$



Write the decimal for the number of metres.

12. 82 cm **0.82 m** 13. 3 cm **0.03 m** 14. 54 cm **0.54 m** 15. 61 cm **0.61 m** 16. 47 cm **0.47 m**

Write each measurement in centimetres.

17. 0.24 m **24 cm** 18. 0.96 m **96 cm** 19. 0.40 m **40 cm** 20. 0.02 m **2 cm** 21. 0.35 m **35 cm**

Tile Patterns

Discover the patterns in the rows and columns. Copy and complete the chart.

0.31	0.33	0.35	0.37
0.32	0.35	0.38	0.41
0.33	0.37	0.41	0.45
0.34	0.39	0.44	0.49

13

Assigning the Practice

Minimum: 1-11

Average: 1-21

Enriched: 1-21

Reinforcement

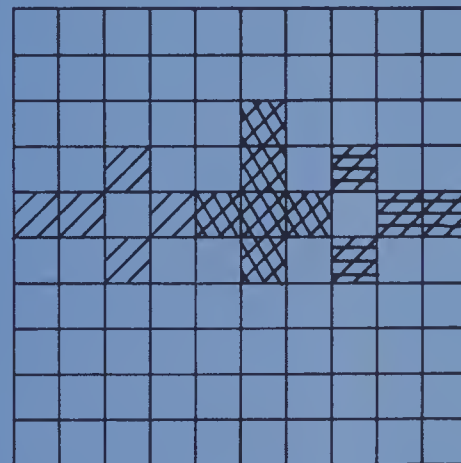
1. Assign *Tile Patterns* at the bottom of page 13. All students should be able to find the number patterns easily.

2. Prepare a stack of 10 by 10 grids. Ask the students to colour in some of the 100 squares and then to label the amount of coloured and uncoloured squares as a decimal in hundredths and in words.

3. Cut various lengths of yarn to 1 m. Ask the students to measure them in centimetres and to label them in decimal parts of a metre.

Enrichment

1. Have the students make tile patterns with 100 squares of several different colours. Ask them to determine the amount of squares in each colour according to decimal value.



0.05 of the figure is red.
0.85 of the figure is white.
0.06 of the figure is green.
0.04 of the figure is yellow.

2. Discuss the uses of hundredths of a second in sports. Show a digital watch which displays hundredths of a second and talk about the time notation 1:45:20. Ask the students to research and list sports records that are in hundredths of a second.

Extra Practice

Worksheet N6

Pages 12-13

Write the decimal.

1. $\frac{89}{100} =$ **0.89** 2. $\frac{25}{100} =$ **0.25** 3. $\frac{4}{100} =$ **0.04** 4. $\frac{5}{100} =$ **0.05**
5. eleven hundredths = **0.11** 6. one hundredth = **0.01**
7. two dimes = **\$0.20** 8. seven pennies = **\$0.07**

Write as part of a metre using decimals.

9. 47 cm = **0.47 m** 10. 29 cm = **0.29 m** 11. 85 cm = **0.85 m**
12. 11 cm = **0.11 m** 13. 40 cm = **0.40 m** 14. 8 cm = **0.08 m**

Write in centimetres.

15. 0.43 m = **43 cm** 16. 0.01 m = **1 cm** 17. 0.62 m = **62 cm**
18. 0.19 m = **19 cm** 19. 0.03 m = **3 cm** 20. 0.55 m = **55 cm**

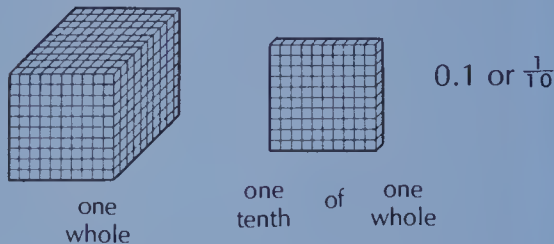
UNIT 1 LESSON 7

Objective N7

Write decimals equal to or greater than 1.

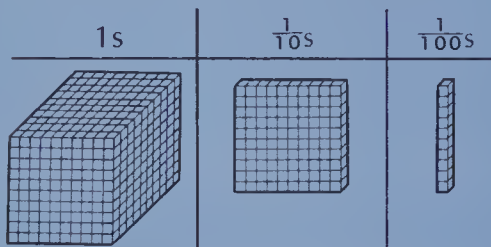
Introducing the Lesson

Review the place value of tenths and hundredths using place-value blocks. Show the large $10 \times 10 \times 10$ block as *one whole*, and then ask what fractional part of the block the 10×10 flat is.



Show a rod of 10 small cubes. Have the students determine that it is one hundredth of one whole block.

Starting with the rod of 10 small cubes, have the students recall how each place is *ten times* greater than the place to its right in the base ten number system.



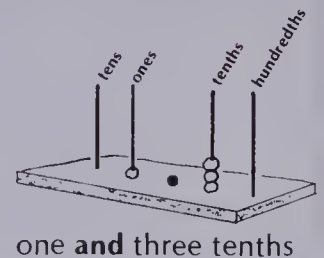
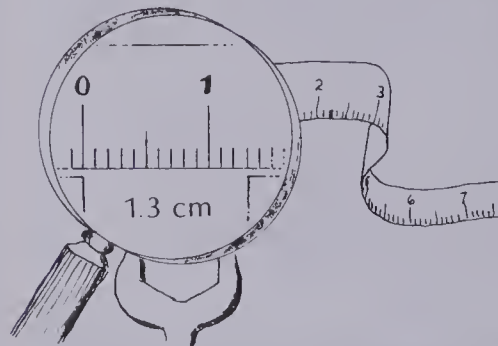
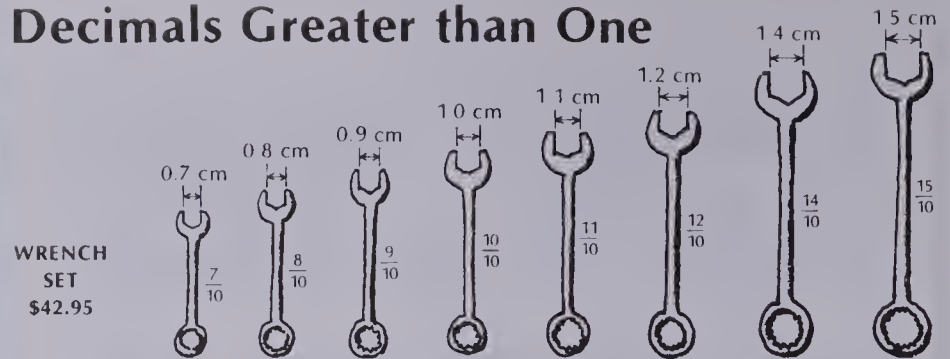
Teaching the Lesson

Point out the lesson example on the top of page 14 and talk about the occasions when we write and use decimals greater than one. Have the students illustrate each of the wrench widths with number blocks. Record their results on the chalkboard. Emphasize the *trading* of 10 flats for one block that is needed when decimals greater than one are illustrated. Stress the two ways of writing the widths: as a fraction and as a decimal.

Explain the proper way to read the decimals written on the chalkboard. Emphasize that the word **and** is said for the decimal point: 1.5 is one **and** five tenths.

Extend the work with decimals greater than one to decimals in hundredths. Ask the students to show these on an abacus or with place-value blocks.

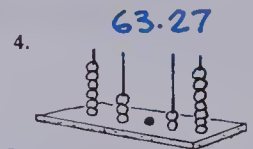
Decimals Greater than One



EXERCISES

Write as a decimal.

- sixteen **and** two tenths 16.2
- seventy-one **and** eleven hundredths 71.11
- twelve **and** two hundredths 12.02
- $\frac{17}{10}$ 1.7 6. $\frac{128}{100}$ 1.28 7. $\frac{495}{100}$ 4.95



Write each amount using numerals and \$.

- three dollars **and** forty-five cents \$3.45
- eighty-five dollars **and** nine cents \$85.09

What is the place value of the underlined digit?

- 75.27 hundredths
- 35.09 tens
- 5.29 tenths

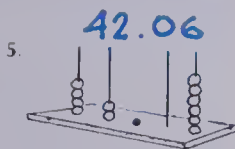
Using the Exercises

- Questions 1 to 9 require the student to write the decimal. Although questions 8 and 9 are amounts of money, the skill is the same. The word "and" is in bold letters to emphasize where the decimal is placed.
- Questions 10 to 12 require that the place value of a specific digit be given.

Practice

Write as a decimal.

1. thirty-five and five tenths **35.5**
2. sixty-one and twelve hundredths **61.12**
3. seventy and seven hundredths **70.07**
4. twenty and four tenths **20.4**
6. $\frac{19}{10}$ **1.9**
7. $\frac{27}{10}$ **2.7**
8. $\frac{10}{10}$ **1.0**
9. $\frac{50}{10}$ **5.0**
10. $\frac{159}{100}$ **1.59**
11. $\frac{502}{100}$ **5.02**
12. $\frac{720}{100}$ **7.20**
13. $\frac{624}{100}$ **6.24**



Write each amount using numerals and \$

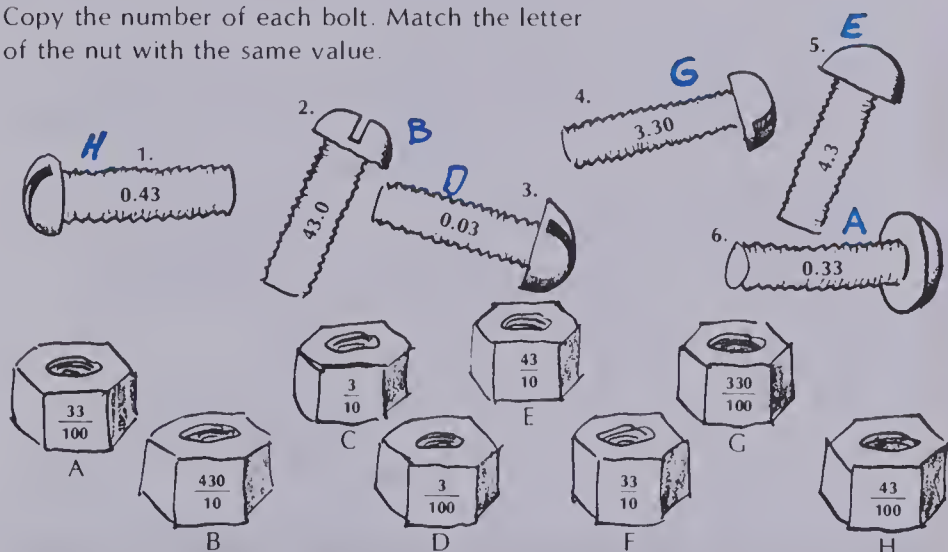
14. forty-two dollars and thirty-seven cents **\$42.37**
15. three dollars and eight cents **\$3.08**

What is the place value of the underlined digit?

16. 36.05 **tens**
17. 1.04 **hundredths**
18. 7.2 **tenths**
19. 35 27 **tenths**
20. 58.06 **ones**
21. 675 **ones**
22. 29.46 **hundredths**
23. 47.03 **tenths**

The Perfect Fit

Copy the number of each bolt. Match the letter of the nut with the same value.



15

Assigning the Practice

Minimum: 1-23

Average: 1-23

Enriched: 1-23

Reinforcement

1. Assign *The Perfect Fit* at the bottom of page 15 to all students. The exercise provides additional practice in recognizing decimal and fraction equivalents.

2. Make a set of 15 pairs of decimal and fraction equivalent cards.



Have the students match the equivalents or use the cards to play "Concentration".

3. Cut out pictures of hardware store items and their prices and attach them to cards. Have the students write each amount as a fraction.

$$\$2.38 = \frac{238}{100}$$

Enrichment

1. Have the students investigate and then write whole numbers as fractions and decimals.

$$5 = \frac{50}{10}, \frac{500}{100}, \text{ or } 5.0$$

$$8 = \frac{80}{10}, \frac{800}{100}, \text{ or } 8.00$$

2. Ask the students to do the following activities using centimetre rulers.

a. Draw line segments of 27 mm, 49 mm, 73 mm, 8 mm, 70 mm, and 2 mm.

Label each segment in millimetres and in centimetres, e.g., 27 mm or 2.7 cm.

b. Draw and label line segments of 0.5 cm, 0.3 cm, 4.7 cm, 5.3 cm, 9.8 cm, 7.6 cm.

Extra Practice

Write the decimal.

1. fourteen and three tenths **14.3**
2. eighteen and two hundredths **18.02**
3. sixty-five and nine tenths **65.9**
4. forty-nine and seven hundredths **49.07**
5. eighty-one and five tenths **81.5**
6. fifty-two and seventy-four hundredths **52.74**
7. $\frac{24}{10}$ **2.4**
8. $\frac{50}{10}$ **5.0**
9. $\frac{98}{10}$ **9.8**
10. $\frac{135}{10}$ **13.5**
11. $\frac{12}{100}$ **0.12**
12. $\frac{76}{100}$ **0.76**
13. $\frac{234}{100}$ **2.34**
14. $\frac{800}{100}$ **8.00**

What is the place value of the underlined digit?

15. 4.86 **0.8**
16. 37.12 **30**
17. 46 59 **0.09**
18. 14 52 **4**

Worksheet N7

Pages 14-15

Objective N8

Compare decimals using $<$, $=$, or $>$.

Introducing the Lesson

Review the place-value positions from hundredths through tens with an abacus or pocket holder. Make sure that the students can recall how each place is ten times greater than the place to its right.

Review the meanings of the comparison symbols $<$, $=$, and $>$ through the following activities.

1. Insert $<$, $=$, or $>$ to make a true comparison statement.

909 ● 990 6 519 ● 6 519
34 162 ● 31 462 87 256 ● 87 265

2. Name the numbers < 25 but > 19 .

3. Name the numbers > 51 but < 62 .

4. Name the numbers < 104 but > 98 .

Teaching the Lesson

Point out the two widths of garden hose pictured on page 16: 1.11 cm and 1.59 cm. Use an abacus or a chalkboard place-value chart to compare these two numbers. Recall that, when comparing numbers, one always starts with the largest place that the numbers have, that is, with the digits farthest to the left.

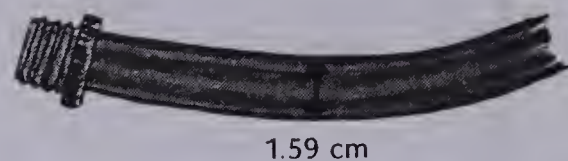
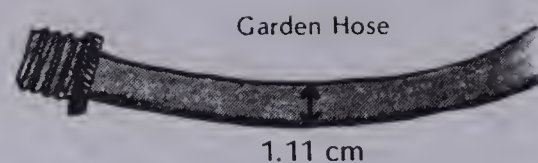
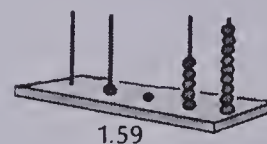
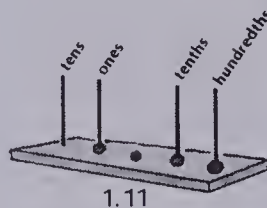
1s	$\frac{1}{10}$ s	$\frac{1}{100}$ s	
1	1	1	Compare ones.
1	5	9	Compare tenths. $1.59 > 1.11$

Write several other pairs of decimals in either tenths or hundredths on the chalkboard. For each pair, ask a student to write a comparison statement and to explain the method used.

Provide practice also in the following kinds of activities which will sharpen the students' decimal comparison skills.

- Order decimals from smallest to largest, or vice versa (5.6, 4.9, 6.3, 5.2, 6.1, 5.0).
- Continue decimal number patterns (4.89, 4.92, 4.95, —, —, —).
- Name the decimals > 1.6 , but < 2.3 .
- Name the decimals < 4.05 , but > 3.97 .

Comparing Decimals



Compare the ones: $1 = 1$

(They are equal, so compare the digits in the next place.)

Compare the tenths: $1 < 5$

$1.11 < 1.59$

EXERCISES

Which is greater?

- 0.7 or 0.4 **0.7**
- 5.89 or 5.98 **5.98**
- 24.01 or 24.10 **24.1**
- 0.28 or 0.27 **0.28**
- 6.76 or 6.79 **6.79**
- 21.06 or 21.05 **21.06**

Copy and complete. Use $<$ or $>$.

- 4.7 \blacksquare 4.2 **$>$**
- 0.6 \blacksquare 0.9 **$<$**
- 51.5 \blacksquare 51.3 **$>$**
- 0.24 \blacksquare 0.27 **$<$**
- 5.37 \blacksquare 5.36 **$>$**
- 19.09 \blacksquare 19.08 **$>$**
- 6.2 \blacksquare 5.7 **$>$**
- 38.04 \blacksquare 39.03 **$<$**
- 1.5 \blacksquare 2.1 **$<$**

Write in order from smallest to largest.

- 1.9, 1.6, 1.2, 1.5, 1.3, 1.8 **1.2, 1.3, 1.5, 1.6, 1.8, 1.9**
- 0.6, 1.1, 0.9, 2.8, 1.5, 0.4 **0.4, 0.6, 0.9, 1.1, 1.5, 2.8**
- 8.24, 8.53, 8.35, 8.42, 8.87 **8.24, 8.35, 8.42, 8.53, 8.87**
- 6.24, 5.98, 6.19, 5.89, 4.32, 7.59 **4.32, 5.89, 5.98, 6.19, 6.24, 7.59**

Using the Exercises

- Questions 1 to 6 require the student to determine the greater decimal.
- Questions 7 to 15 involve choosing $<$ or $>$ and writing a true comparison statement.
- Questions 16 to 19 require that decimal numbers be ordered from smallest to largest. Students will have to use their comparison skills as they order the numbers.

PRACTICE

Copy and complete. Use < or >.

1. 15.3 ■ 15.4 <
2. 92.13 ■ 92.07 >
3. 18.50 ■ 19.50 <
4. 0.49 ■ 0.40 >
5. 5.30 ■ 4.32 >
6. 0.20 ■ 0.19 >
7. 11.27 ■ 12.72 <
8. 46.01 ■ 46.10 <
9. 3.76 ■ 3.67 >
10. 34.51 ■ 24.50 >
11. 76.12 ■ 75.98 >
12. 7.8 ■ 8.7 <

Write the next three decimals in the pattern.

13. 0.2, 0.4, 0.6, ■, ■, ■ 0.8, 1.0, 1.2
14. 0.48, 0.49, 0.50, ■, ■, ■ 0.51, 0.52, 0.53
15. 0.25, 0.30, 0.35, ■, ■, ■ 0.40, 0.45, 0.50
16. 1.01, 2.02, 3.03, ■, ■, ■ 4.04, 5.05, 6.06
17. 6.50, 6.75, 7.00, ■, ■, ■ 7.25, 7.50, 7.75

Write in order from smallest to largest.

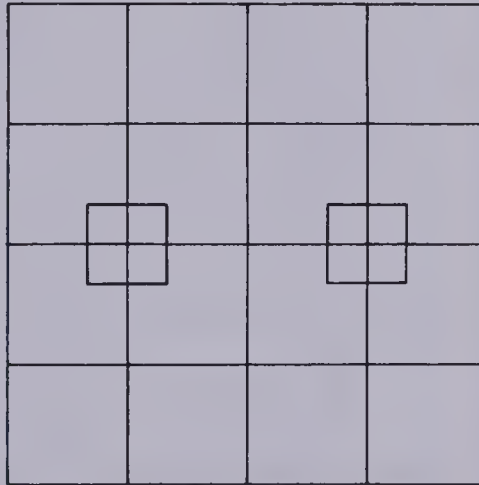
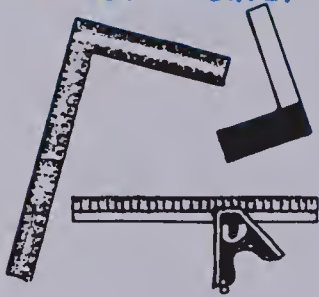
18. 0.2, 1.5, 0.7, 2.1, 0.1, 2.5 0.1, 0.2, 0.7, 1.5, 2.1, 2.5
19. 8.06, 9.05, 7.89, 8.01, 9.01, 8.52 7.89, 8.01, 8.06, 8.52, 9.01, 9.05
20. 12.41, 13.50, 11.22, 12.01, 12.58, 12.09 11.22, 12.01, 12.09, 12.41, 12.58, 13.50

A Square Problem

How many squares
can you find?

Hint! Make a list.

27 squares, not counting
the instruments.



17

Assigning the Practice

Minimum: 1-12, 13-14, 18-19

Average: 1-20

Enriched: 1-20

Reinforcement

1. Prepare a set of cards labelled: 36.2, 34.5, 36.7, 34.2, 35.7, etc. Distribute half of the cards to each of two players. Each person's cards are kept in a pile, face down. Both players turn over their top cards simultaneously. The first player to recognize the greater decimal number says so and claims the pair of cards. The player with the most pairs is the winner.

2. Prepare several sets of cards with decimal numbers in either tenths or hundredths. Using a timer, have the students arrange the numbers in order (from smallest to largest or vice versa) and record their times. Encourage them to better their times by trying again.

Enrichment

1. Assign *A Square Problem*, page 17 (bottom). Once the solutions to the problem have been reached, discuss the methods used for identifying the squares. Talk about the instruments, also called squares, that are pictured on the page and that can be counted in the solution.

2. Ask the students to investigate gasoline prices at several community gas stations. Have them note the location of each station and the gas price and then prepare a chart which lists their findings in order. Display the chart.

Extra Practice

Worksheet N8

Pages 16-17

Complete using <, =, or >.

1. 37.8 < 37.9
2. 92.6 > 91.9
3. 51.25 > 51.24
4. 24.60 = 24.60
5. 43.12 > 42.12
6. 80.73 < 81.73
7. 9.8 > 8.9
8. 2.95 = 2.95
9. 58.06 < 58.60

Write in order from smallest to largest.

10. 24.3, 26.5, 20.1, 28.2, 23.5, 27.1, 28.3
20.1, 23.5, 24.3, 26.5, 28.2, 28.3
11. 71.50, 71.69, 71.08, 71.31, 70.86, 71.92, 70.42
70.42, 70.86, 71.08, 71.31, 71.50, 71.69, 71.92
12. 63.48, 64.04, 63.42, 63.45, 63.40, 64.12, 63.41
63.40, 63.41, 63.42, 63.45, 63.48, 64.04, 64.12

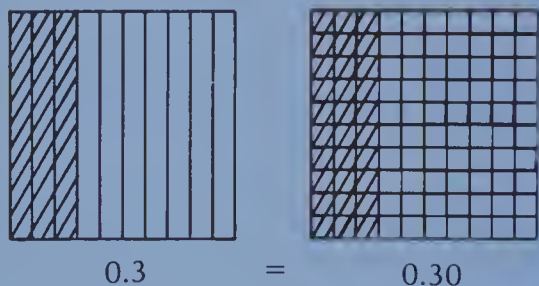
UNIT 1 LESSON 9

Objective N9

Annex zeros to compare decimals.

Introducing the Lesson

On an overhead projector, show a 10×10 grid. Demonstrate these **equalities** by shading the appropriate squares: $0.1 = 0.10$, $0.2 = 0.20$, $0.3 = 0.30$, etc.



Provide practice at the chalkboard in completing these equalities:

$0.4 = 0.40$, $0.9 = 0.90$, $0.60 = 0.6$,
 $5 = 5.0$, $9 = 9.0$, etc.

Teaching the Lesson

Discuss the comparison problem involving the lengths of two saws at the top of page 18. Note that one length is in tenths and the other is in hundredths. Explain that the comparison of decimals is easier when they each have the same number of places. Discuss how the length 0.6 m can be rewritten in hundredths. Ask the students to complete the equality:

$$0.6 \text{ m} \rightarrow 0.60 \text{ m}$$

$$0.58 \text{ m} \rightarrow 0.58 \text{ m}$$

Comparing tenths, $0.60 \text{ m} > 0.58 \text{ m}$,
 $0.6 \text{ m} > 0.58 \text{ m}$.

Write these pairs of decimals on the chalkboard: 16.04 and 16.4, 27 and 27.01, 3.5 and 3.49, 4.6 and 5.

Ask the students to compare them, explaining how they annexed a zero and then decided on the greater decimal.

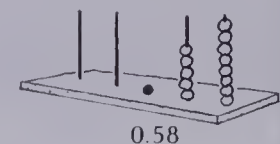
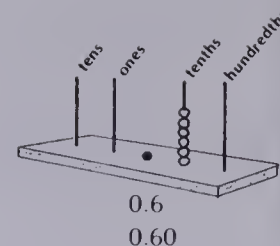
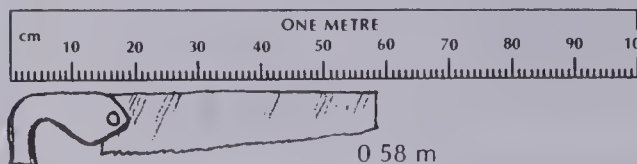
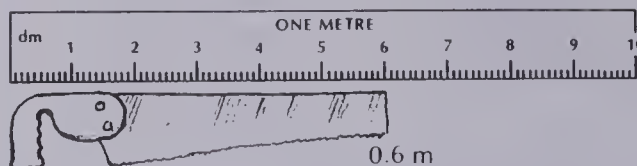
Have the students order these decimals from smallest to largest:

35, 34.2, 3.5, 34.19, 35.1, 35.01.

Point out how annexing zeros to write each number in hundredths makes the ordering easier.

Comparing Decimals

Which saw is shorter?



To compare the numbers, write a **zero** after the last digit in 0.6.

$$\begin{array}{r} 0.60 \\ 0.58 \\ \hline 0.6 > 0.58 \end{array}$$

EXERCISES

Copy and complete.

1. $0.4 = 0.4$ ☒ ☐
2. $7.5 = 7.5$ ☒ ☐
3. $6 = 6.$ ☒ ☐
4. $13.2 = 13.$ ☒ ☒ ☐
5. $0.9 = 0.$ ☒ ☒ ☐
6. $17 = 17.$ ☒ ☒ ☐

Write a decimal in hundredths that has the same value.

7. 0.4 ☐ ☐
8. 51.2 ☐ ☐
9. 4.7 ☐ ☐
10. 45 ☐ ☐

Copy and complete. Use $<$ or $>$ for ☒

11. $0.40 > 0.39$ ☒
12. $9.59 < 9.60$ ☒
13. $6.20 > 6.02$ ☒
14. $3.05 < 3.50$ ☒
15. $38.1 < 38.0$ ☒
16. $15.00 < 15.01$ ☒
17. $5.2 < 5.02$ ☒
18. $73.09 < 73.9$ ☒
19. $16 < 16.01$ ☒
20. $42.09 < 41.79$ ☒
21. $6.2 < 7$ ☒
22. $86.4 < 86.04$ ☒

Using the Exercises

- Questions 1 to 10 involve writing equalities. Students are to equate decimals in tenths or hundredths and whole numbers.
- Questions 11 to 22 develop the writing of a true comparison statement for two numbers having a different number of decimal places. Questions 11 to 16 show the student how to annex the zero before comparing. For questions 17 to 22, the student must annex the zero on his or her own.

PRACTICE

Copy and complete.

1. $20.5 = 20.\square\square$ **50** 2. $9.30 = 9.\square$ **3** 3. $71.6 = 71.\square\square$ **60**
4. $63 = 63.\square\square$ **00** 5. $5.8 = 5.\square\square$ **80** 6. $89 = 89.\square\square$ **00**

Write a decimal in hundredths that has the same value.

7. 67 **67.00** 8. 99 **99.00** 9. 24.4 **24.40** 10. 0.1 **0.10**

Copy and complete. Use < or >.

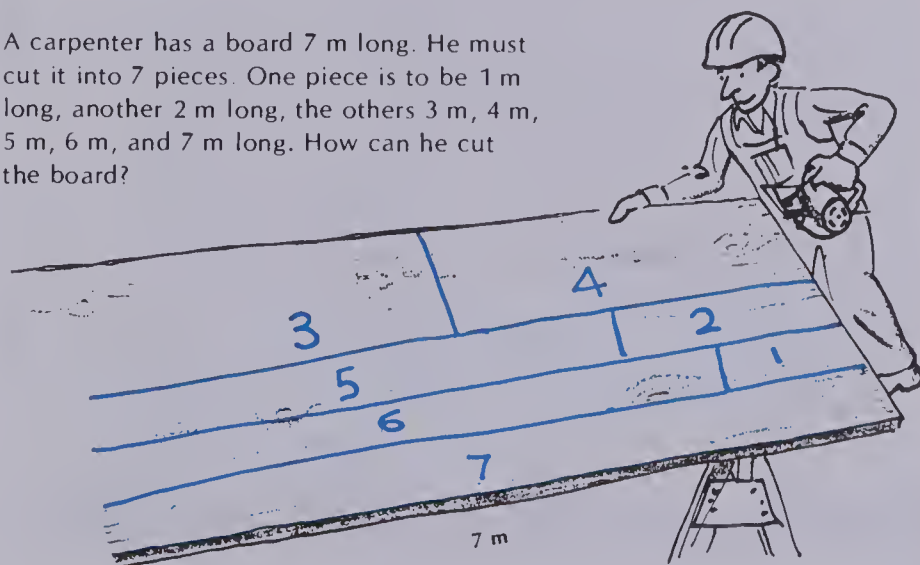
11. $53.6 \square 53.06$ **>** 12. $19 \square 18.75$ **>** 13. $0.04 \square 0.4$ **<**
14. $21.09 \square 22.08$ **<** 15. $4.5 \square 4.39$ **>** 16. $27.2 \square 28.1$ **<**
17. $3.7 \square 3.07$ **>** 18. $65 \square 64.01$ **>** 19. $46.09 \square 47$ **<**
20. $9.6 \square 8.76$ **>** 21. $44.08 \square 44.8$ **<** 22. $57 \square 56.99$ **>**

Write in order from smallest to largest.

23. 1.2, 12, 1.02, 2.1, 21, 2.01 **1.02, 1.2, 2.01, 2.1, 12, 21**
24. 3.3, 0.33, 33.3, 3.03, 33, 30.3 **0.33, 3.03, 3.3, 30.3, 33, 33.3**
25. 76, 0.76, 7.6, 6.07, 6.7, 0.67 **0.67, 0.76, 6.07, 6.7, 7.6, 76**

Saw Seven Sections

A carpenter has a board 7 m long. He must cut it into 7 pieces. One piece is to be 1 m long, another 2 m long, the others 3 m, 4 m, 5 m, 6 m, and 7 m long. How can he cut the board?



19

Extra Practice

Complete.

1. $41.6 = 41.\underline{60}$ 2. $18 = 18.\underline{00}$ 3. $45.2 = 45.\underline{20}$
4. $29.9 = 29.\underline{90}$ 5. $32 = 32.\underline{00}$ 6. $96.1 = 96.\underline{10}$

Write a decimal in hundredths that has the same value.

7. $4.9 = \underline{4.90}$ 8. $22 = \underline{22.00}$ 9. $0.2 = \underline{0.20}$ 10. $67 = \underline{67.00}$

Complete. Use < or >.

11. $43.2 \underline{>} 42.99$ 12. $16.05 \underline{<} 16.5$ 13. $48 \underline{>} 47.09$
14. $18.7 \underline{>} 18.69$ 15. $5.7 \underline{>} 4.78$ 16. $66.92 \underline{>} 66.9$
17. $54.01 \underline{<} 54.1$ 18. $39.6 \underline{>} 38.99$ 19. $92.05 \underline{>} 91.5$

Write in order from smallest to largest.

20. 4.7, 47, 44.7, 47.4, 4.07, 4.77, 4.47 **4.07, 4.47, 4.7, 4.77, 44.7, 47, 47.4**

Worksheet N9

Pages 18-19

Assigning the Practice

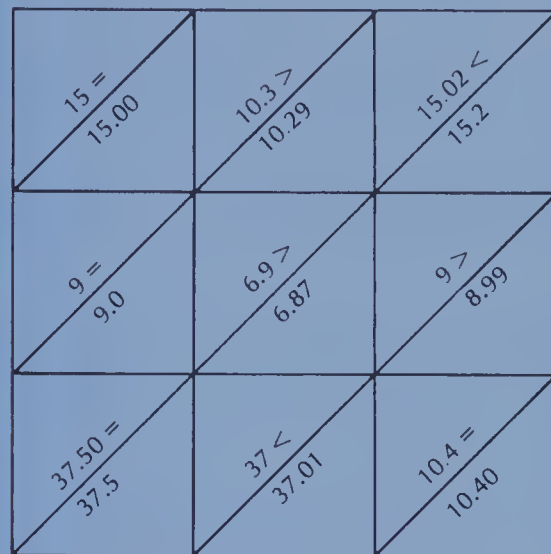
Minimum: even numbers

Average: 1-23

Enriched: 3-25

Reinforcement

1. Prepare the following worksheet puzzle. The students are to cut out the pieces, mix them, put the puzzle together again, and glue it to stiff paper.

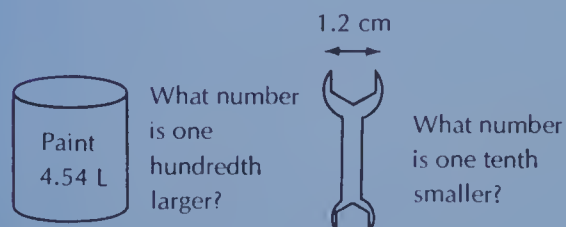


2. Prepare a set of cards with whole numbers and decimal numbers in tenths and hundredths (16, 16.01, 15.9, 16.95, 14.2, 17.1, 14.95, etc.) Give the number cards and cards with the symbols < and > to individual students, who must write as many true comparison statements as they can with them.

Enrichment

1. Assign Saw Seven Sections, page 19 (bottom). Encourage the students to draw diagrams of their solutions, showing where the cuts would be made.

2. Have the students help prepare work cards by finding items in a hardware store catalog that are sold in quantities or measurements in tenths or hundredths. Have the students cut out and paste pictures of these items to the cards. Write comparison questions on the cards for others to solve.



Objective N10

Round decimals to the nearest whole number.

Introducing the Lesson

To emphasize the need for rounded numbers, discuss the role that rounding plays in various forms of measurement. Point out the scales at the top of page 20 and explain that we often do not need exact decimal numbers. The mass of the barrels would be better understood when rounded to the nearest whole number. Similar needs for whole numbers may arise when measuring lengths. (For example, when people are measured for the proper length of ski for their height, the number of centimetres must be rounded to the nearest whole centimetre because skis are made that way.)

Teaching the Lesson

Use the mass of the 38.7 kg barrel in the lesson example to start your explanation of how to round decimal numbers. Draw a number line on the chalkboard and number it as shown on page 20. Show how 38.7 is closer to 39 than it is to 38, and therefore it **rounds up** to 39. The same procedure might also be used for rounding 16.35 kg to the nearest whole kilogram. Use a number line to point out how 16.35 is closer to 16 than to 17. Thus, it would **round down** to 16. Round several other decimal numbers to the nearest whole number until the students understand the concept.

When the students can use this method successfully, show them another method of rounding. Write 38.7 on the chalkboard again, but without a number line. Put a pointer, or arrow, under the 8 to indicate that you are rounding to the nearest whole number.

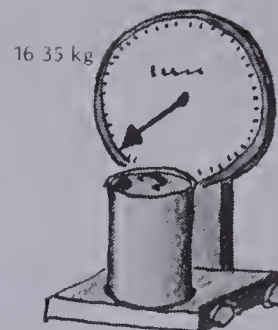
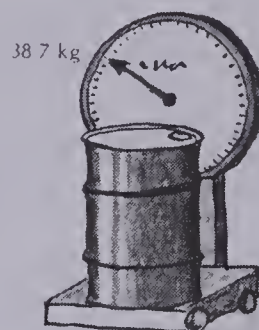
38.7



Tell the students to look at the digit to the right of this arrow. If the digit to the right is 5 or more, the digit with the arrow is increased by one.

If the digit to the right of the digit with the arrow is less than 5, the digit with the arrow remains the same.

Rounding Decimals



How heavy are the barrels to the nearest kilogram?



38.7 kg rounded to the nearest kilogram is 39 kg.



16.35 kg rounded to the nearest kilogram is 16 kg.

EXERCISES

Round to the nearest whole number.

- | | | | |
|------------------|---------------------|---------------------|-------------------|
| 1. 5.2 5 | 2. 96.5 97 | 3. 6.9 7 | 4. 39.7 40 |
| 5. 0.3 0 | 6. 0.8 1 | 7. 0.50 1 | 8. 0.2 0 |
| 9. 4.27 4 | 10. 63.81 64 | 11. 94.53 95 | 12. 0.91 1 |

Round to the nearest kilogram.

- | | | | |
|--------------------------|------------------------|--------------------------|-------------------------|
| 13. 56.8 kg 57 kg | 14. 9.2 kg 9 kg | 15. 65.5 kg 66 kg | 16. 3.25 kg 3 kg |
|--------------------------|------------------------|--------------------------|-------------------------|

Round to the nearest centimetre.

- | | | | |
|------------------------|--------------------------|---------------------------|---------------------------|
| 17. 5.8 cm 6 cm | 18. 31.3 cm 31 cm | 19. 18.02 cm 18 cm | 20. 99.5 cm 100 cm |
|------------------------|--------------------------|---------------------------|---------------------------|

Round to the nearest dollar.

- | | | | |
|-------------------------|-------------------------|-------------------------|-------------------------|
| 21. \$16.75 \$17 | 22. \$48.09 \$48 | 23. \$33.56 \$34 | 24. \$79.50 \$80 |
|-------------------------|-------------------------|-------------------------|-------------------------|

20

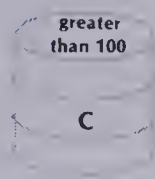
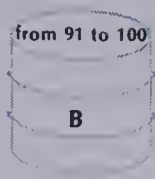
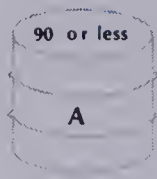
Using the Exercises

- Questions 1 to 24 give practice in rounding to the nearest whole number. To aid the student, the number in the ones place is printed in bold face for the first few examples. For questions 13 to 24, remind the students that they must not only round each number to the nearest whole number, but also must label their answer appropriately.

PRACTICE

Round to the nearest whole number. Write the letter of the barrel into which the rounded number falls.

1. 99.92 **B** 2. 101.38 **C** 3. 100.19 **B** 4. 89.61 **A** 5. 99.49 **B**
6. 91.3 **B** 7. 90.74 **B** 8. 89.47 **A** 9. 90.5 **B** 10. 100.5 **C**



Round to the nearest metre.

11. 92.6 m **93 m** 12. 57.5 m **58 m** 13. 5.41 m **5 m** 14. 6.8 m **7 m** 15. 2.09 m **2 m**

Round to the nearest dollar.

16. \$76.28 **\$76** 17. \$95.55 **\$96** 18. \$9.05 **\$9** 19. \$21.84 **\$22** 20. \$3.65 **\$4**

REVIEW

Write the decimal.

1. nine tenths **0.9** 2. **0.6** 3. $\frac{7}{10}$ **0.7** 4. **0.4**

5. $\frac{35}{100}$ **0.35** 6. $\frac{9}{100}$ **0.09** 7. $\frac{1}{100}$ **0.01** 8. $\frac{30}{100}$ **0.30**

9. four and three tenths **4.3** 10. sixty-six and seven hundredths **66.07**

Copy and complete. Use < or >.

11. 4.2 4.3 **<** 12. 7.10 7.01 **>** 13. 35.19 35.29 **<**

14. 6.03 6.3 **<** 15. 38 37.2 **>** 16. 15.01 15 **>**

Round to the nearest whole number.

17. 0.5 **1** 18. 6.19 **6** 19. 23.61 **24**

21

Assigning the Practice

Minimum: 11-20

Average: 1-20

Enriched: 1-20

Review Exercises

Questions	Objective	Pages
1-4	N5	10-11
5-8	N6	12-13
9-10	N7	14-15
11-13	N8	16-17
14-16	N9	18-19
17-19	N10	20-21

Reinforcement

1. Ask students to measure the lengths and widths of the following objects in centimetres and to round to the nearest whole centimetre: math book, desk top, sheet of paper, calendar.

2. Give each student a length of string or ribbon. Ask them to cut the lengths into several shorter lengths. Next they are to measure each length, rounding to the nearest centimetre. The set of lengths can then be traded with another student, measured again, and the rounded measures compared.

3. Have the students cut out the prices of items from the newspaper or from a catalog and paste them to stiff paper. The students should then round the numbers to the nearest whole dollar.

Enrichment

1. Students who understand rounding very well may work out the following multiplication and division of decimal problems with a calculator. Ask them to first write down the exact answers and then to round each answer to the nearest whole number.

$$\begin{array}{r} 623 \\ \times 5.4 \\ \hline \end{array} \quad \begin{array}{r} 75.3 \div 6 \\ 8462 \div 2.5 \end{array} \quad \begin{array}{r} 931 \\ \times 0.8 \\ \hline \end{array}$$

2. Have each student measure the length of one of their shoes to the nearest centimetre. They can then collect all the measurements from the class and make a bar graph. Display the graph.

Extra Practice

Round to the nearest whole number.

1. 8.4 **8** 2. 2.5 **3** 3. 24.91 **25**
4. 6.49 **6** 5. 9.48 **9** 6. 39.54 **40**

Round to the nearest metre.

7. 99.52 m **100 m** 8. 8.08 m **8 m** 9. 73.38 m **73 m**

Round to the nearest decimetre.

10. 5.5 dm **6 dm** 11. 43.1 dm **43 dm** 12. 84.08 dm **84 dm**

Round to the nearest centimetre.

13. 2.7 cm **3 cm** 14. 11.9 cm **12 cm** 15. 36.61 cm **37 cm**

Round to the nearest dollar.

16. \$14.83 **\$15** 17. \$50.50 **\$51** 18. \$101.36 **\$101**

Worksheet N10

Pages 20-21

Objective PS1

Read and interpret charts to solve problems involving the comparison and ordering of related facts.

Introducing the Lesson

Discuss with the students the everyday uses of charts and tables and the variety of information they can present. Ask the students to bring in charts they find in newspapers, magazines, textbooks, and reports. Advise them that some of these may be too difficult for them to understand, but that they will point out the many uses of charts. Note that charts play an important role in practical decision making and that their chief usefulness is in their condensed organization of facts.

Teaching the Lesson

Point out the chart from a hardware store catalog on page 22. Talk about the kinds of pliers listed and the format of the chart. Note how some of the pliers come in two lengths. Discuss the uses of this chart.

Using the Exercises

- Questions 1 to 10 require the student to use the information given in the chart to find the correct answer. Some of the questions should be read and discussed orally.

Reinforcement

Ask the class to make a chart with the heading, Birthday, Month, Day, Year. Have the students make up questions that could be answered from the chart.

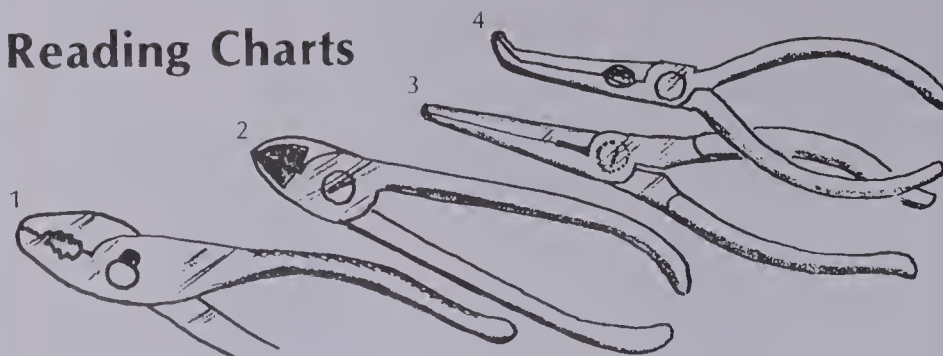
Enrichment

Use the charts which the students brought in from newspapers or magazines for Introducing the Lesson. Ask the students to develop a series of questions related to each chart. The questions can be glued to stiff paper and displayed along with the chart so that the rest of the class can answer them.

Problem Solving Activities

Assign Level 5, Unit 1.

Reading Charts



	Length	Price	Length	Price
1 Slip-joint pliers	15.2 cm	\$1.99	20.3 cm	\$3.99
2 Cutting pliers	11.4 cm	\$5.49	17.8 cm	\$6.99
3 Long-nose pliers	14.0 cm	\$5.99	20.3 cm	\$6.99
4 Side-cutting pliers	16.5 cm	\$6.99		

EXERCISES

Answer these questions from the information in the chart.

- Which price is the lowest? List the prices from lowest to highest. $\$1.99, \$3.99, \$5.49, \$5.99, \$6.99, \$6.99, \$6.99$
- Which length is the shortest? List the lengths from shortest to longest. $11.4 \text{ cm}, 14.0 \text{ cm}, 15.2 \text{ cm}, 16.5 \text{ cm}, 17.8 \text{ cm}, 20.3 \text{ cm}, 20.3 \text{ cm}$
- Which pliers comes in only one length? **#4**
- What is the price of the 17.8 cm cutting pliers? $\$6.99$
- What is the price of the 16.5 cm side-cutting pliers? $\$6.99$
- What is the length of the \$3.99 slip-joint pliers? 20.3 cm
- What is the length of the \$5.99 long-nose pliers? 14.0 cm
- Which is longer, the \$6.99 side-cutting pliers or the \$6.99 cutting pliers? **cutting pliers**
- Which is longer, the \$1.99 slip-joint pliers or the \$5.99 long-nose pliers? **slip-joint pliers**
- Which is more expensive, the 20.3 cm slip-joint pliers or the 20.3 cm long-nose pliers? **long-nose pliers**

22

Post-test

Unit 1

Write in expanded form.

- 3804 $3000 + 800 + 4$
- 13 753 $10\ 000 + 3000 + 700 + 50 + 3$
- 607 294 $600\ 000 + 7000 + 200 + 90 + 4$
- 5 703 681 $5\ 000\ 000 + 700\ 000 + 3000 + 600 + 80 + 1$
- 439 746 053 $400\ 000\ 000 + 30\ 000\ 000 + 9\ 000\ 000 + 700\ 000 + 40\ 000 + 6000 + 50 + 3$

Write in standard form.

- $50\ 000 + 1000 + 400 + 30 + 2 = \underline{51\ 432}$
- $200\ 000 + 10\ 000 + 6000 + 5 = \underline{216\ 005}$
- $4\ 000\ 000 + 60\ 000 + 2000 + 300 + 10 + 7 = \underline{4\ 062\ 317}$
- seventeen million three hundred twenty thousand forty-nine = $\underline{17\ 320\ 049}$
- one hundred two million eleven thousand two hundred four = $\underline{102\ 011\ 204}$

Write the place value of the underlined digit.

- 673 427 149 600 000 000
- 865 246 137 40 000

TEST

UNIT 1



Write in expanded form.

1. 7215 **#1 7000 + 200 + 10 + 5**
 2. 25 391 **#2 20 000 + 5 000 + 300 + 90 + 1**
 3. 947 208 **900 000 + 40 000 + 7000 + 200 + 8**

4. 4 007 682 **4 000 000 + 7000 + 600 + 80 + 2**
 5. 296 000 011 **#5 200 000 000 + 90 000 000 + 6 000 000 + 10 + 1**

Write in standard form.

6. 20 000 + 3000 + 70 + 1 **23 071**
 7. five hundred fourteen thousand sixty **514 060**
 8. twenty-eight million one hundred thousand seventeen **28 100 017**

9.  **403 050 123**
 10.  **45 242 050**

Write the place value of the underlined digit.

11. 235 162 421 **ten millions**
 12. 198 271 425 **hundred thousands**

Copy and complete. Use <, >, or =

13. 20 196 **■** 20 916 **<**
 14. 42 075 300 **■** 42 175 300 **<**

Round each number to the nearest ten, to the nearest hundred, and to the nearest thousand

15. 3876 **3880, 3900, 4000**
 16. 705 982 **705 980, 706 000, 706 000**
 17. 56 095 **56 100, 56 000**

Write the decimal.

18. four tenths **0.4**
 19. five hundredths **0.05**
 20. seven and twelve hundredths **7.12**
 21. forty and nine tenths **40.9**
 22. twenty-one and three hundredths **21.03**

Copy and complete. Use <, = or >.

23. 876.4 **■** 876.04 **>**
 24. 92.57 **■** 92.75 **<**
 25. 2.5 **■** 2.49 **>**

Round to the nearest whole number.

26. 26.5 **27**
 27. 145.37 **145**
 28. 267.92 **268**

Unit 1 Objective	Test Questions	Pages
N1	1-7, 12	2-3
N2	4, 5, 8-11	4-5
N3	13, 14	6-7
N4	15-17	8-9
N5	18	10-11
N6	19	12-13
N7	20-22	14-15
N8	24	16-17
N9	23, 25	18-19
N10	26-28	20-21

Complete. Use <, =, or >.

13. 38 764 **<** 38 964
 14. 29 115 704 **<** 29 115 710

Round to the nearest ten, to the nearest hundred, and to the nearest thousand.

15. 5863 **5860, 5900, 6000**
 16. 17 497 **17 500, 17 500, 17 000**
 17. 336 264 **336 260, 336 300, 336 000**

Write the decimal.

18. six tenths = **0.6**
 19. seven hundredths = **0.07**
 20. eight and four hundredths = **8.04**
 21. $\frac{16}{10}$ = **1.6**
 22. $\frac{137}{100}$ = **1.37**

Complete. Use <, =, or >.

23. 37.2 **>** 32.07
 24. 59.32 **>** 59.23
 25. 75.9 **>** 75.09

Round to the nearest whole number.

26. 47.3 **47**
 27. 249.81 **250**
 28. 6.52 **7**

UNIT 2

Addition and Subtraction

Theme: Sports

Lesson		Objective	Pages
Preview		Review basic addition and subtraction facts to 18.	25
1	A1	Add two-digit numbers, with and without regrouping.	26-27
2	A2	Add three-digit numbers, with and without regrouping.	28-29
3	A3	Add more than two numbers.	30-31
4	A4	Add four- and five-digit numbers.	32-33
5	A5	Subtract two-digit numbers, with regrouping.	34-35
6	A6	Subtract three-digit numbers, with regrouping.	36-37
7	A7	Subtract four-digit numbers, with regrouping.	38-39
8	A8	Add and subtract decimals in tenths.	40-41
9	A9	Add and subtract decimals in hundredths.	42-43
10	PS2	Solve word problems involving addition and subtraction.	44-45
Test		Addition and subtraction	46
Review		Place value	47

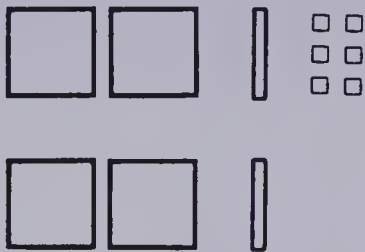
About This Unit

- The purpose of the unit is to:
1. review and develop addition and subtraction skills with whole numbers of up to five digits and with decimals in tenths and hundredths;
 2. use previously learned rounding concepts to estimate sums and differences;
 3. develop skills in checking subtraction by adding;
 4. apply addition and subtraction skills to problem solving situations.

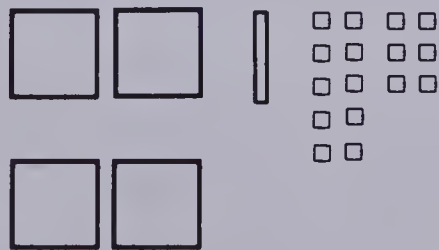
The instructional strategy follows a developmental sequence. It is essential that the lessons be studied in the order presented for maximum student benefit. Several skills developed in this unit are either a review of grade 4 work or an extension of the first unit in grade 5. Place-value concepts, which were the main emphasis of Unit 1, are again stressed as addition and subtraction algorithms are progressively developed.

As with Unit 1, the place-value chart and number blocks play an important role in providing concrete examples for concept development. The following is an example of the way number blocks can be used to explain the regrouping process in subtraction.

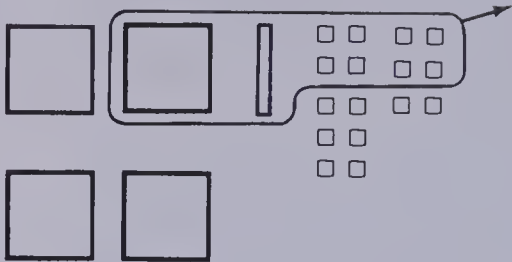
Take 1 flat, 1 rod, and 8 cubes from the following set.



Since there are not enough cubes, trade 1 rod for 10 cubes.



Now subtract.



3 flats, 0 rods, and 8 cubes are left.

100s	10s	1s
	1	16
4	2	6
-1	1	8
3	0	8

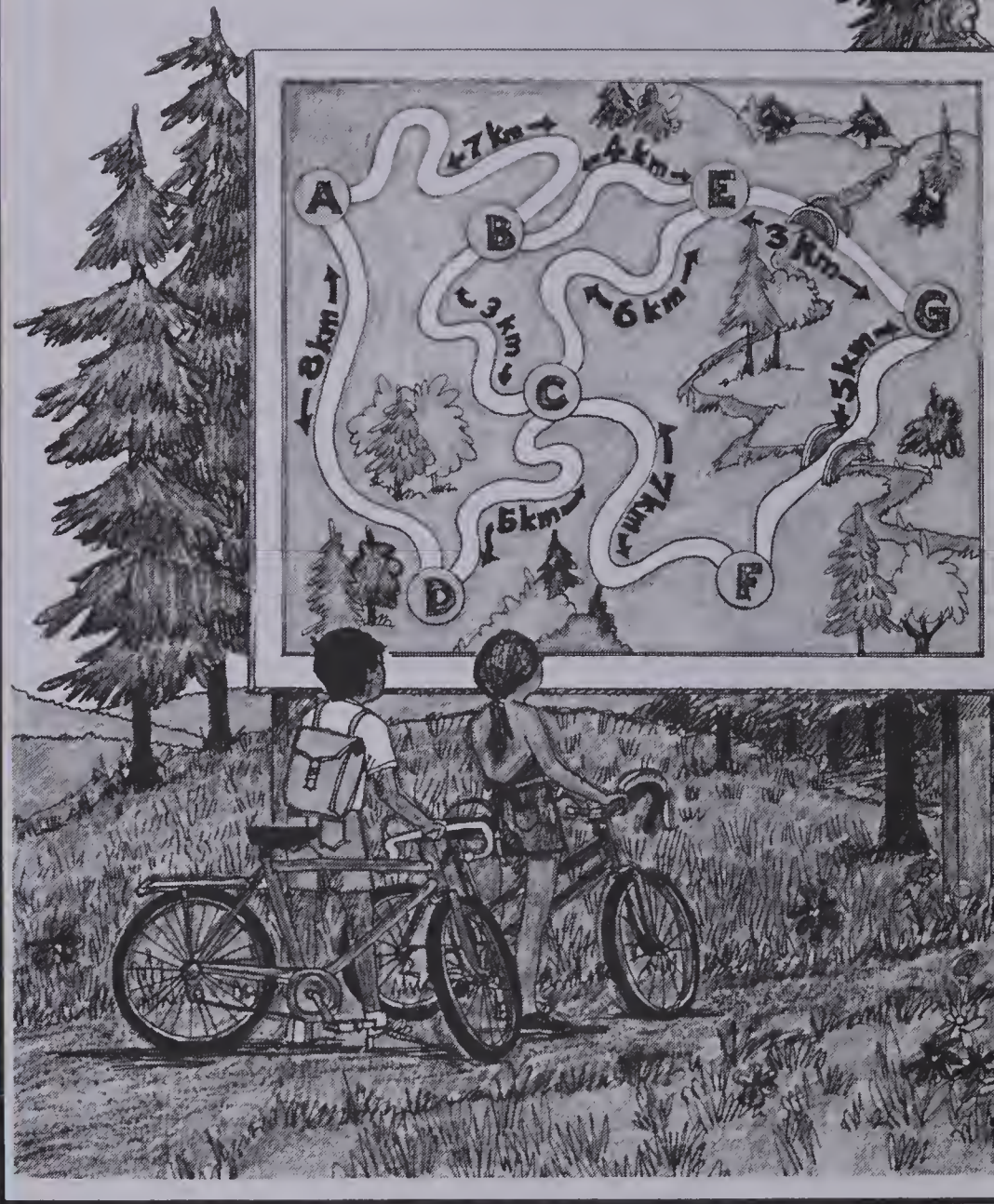
It can be expected that through many experiences with concrete materials like the one shown above students will have a better understanding of the addition and subtraction processes.

Ideas

The theme of this unit, *Sports*, may be used to create a bulletin board display. There are endless examples in sports where addition and subtraction of whole numbers are used. Score keeping in almost all sports is the obvious example. Newspapers and magazines give inexhaustible supplies of scores and statistics that may be used to create addition and subtraction problems related to the objectives of this unit.

UNIT 2

ADDITION & SUBTRACTION



Unit 2 Objective	Test Questions	Pages
A1	1,2	26-27
A2	3,4	28-29
A3	5-10	30-31
A4	11-14,	32-33
A5	15,16	34-35
A6	17-19, 23-25	36-37
A7	20-22	38-39
A8	26,28	40-41
A9	27,29	42-43
PS	30	

Pretest

Add

$$\begin{array}{r} 1. \quad 65 \\ + 32 \\ \hline 97 \end{array}$$

$$\begin{array}{r} 2. \quad 84 \\ + 98 \\ \hline 182 \end{array}$$

$$\begin{array}{r} 3. \quad 376 \\ + 219 \\ \hline 595 \end{array}$$

$$\begin{array}{r} 4. \quad 595 \\ + 788 \\ \hline 1383 \end{array}$$

$$5. \quad 3 + 8 + 9 = 20$$

$$6. \quad 29 + 38 + 76 = 143$$

$$7. \quad 47 + 63 + 19 = 129$$

$$8. \quad 37 + 528 + 6 = 571$$

$$9. \quad 37 + 467 + 58 = 562$$

$$10. \quad 900 + 60 + 3 = 963$$

$$\begin{array}{r} 11. \quad 3576 \\ + 4897 \\ \hline 8473 \end{array}$$

$$\begin{array}{r} 12. \quad 2954 \\ + 8376 \\ \hline 11330 \end{array}$$

$$\begin{array}{r} 13. \quad 27529 \\ + 68545 \\ \hline 96074 \end{array}$$

$$\begin{array}{r} 14. \quad 39724 \\ + 3709 \\ \hline 43433 \end{array}$$

Subtract.

$$\begin{array}{r} 15. \quad 79 \\ - 52 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 16. \quad 81 \\ - 45 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 17. \quad 360 \\ - 179 \\ \hline 181 \end{array}$$

$$\begin{array}{r} 18. \quad 901 \\ - 342 \\ \hline 559 \end{array}$$

Cross-Number Puzzles

Each square below is an addition puzzle.
Copy and complete the puzzle.

Add across		
4	3	
2	5	

Add down

1.	5	2	7
	3	1	4
	8	3	11

2.	2	1	3
	3	4	7
	5	5	10

3.	7	2	9
	1	5	6
	8	7	15

4.	1	0	1
	0	1	1
	1	1	2

5.	8	2	10
	3	7	10
	11	9	20

6.	5	3	8
	4	5	9
	9	8	17

7.	7	3	10
	8	1	9
	15	4	19

8.	6	4	10
	2	3	5
	8	7	15

9.	6	3	9
	5	4	9
	11	7	18

10.	3	3	6
	6	5	11
	9	8	17

11.	7	3	10
	2	4	6
	9	7	16

25

UNIT 2

PREVIEW

Suggestions

Discuss cycling as a sport. Find out which students enjoy it and ask them to relate their experiences with long distance cycling trips.

Draw the students' attention to page 24. The cyclists can travel many routes to get from point A to point G. For example, a cyclist could go from A to B to C to E to G, travelling 7 km + 3 km + 6 km + 3 km, or 19 km in all.

Ask the students to list all the possible routes from A to G (without retracing any part of a route). "What is the shortest route? What is the longest route?"

About the Page

Sketch the first cross-number puzzle on page 25 on the chalkboard. Explain how to add across and down.

Have the students think of several sets of four numbers and put them in a cross-number puzzle frame. Let them discover that the cross-number additions will work for any four numbers.

Draw the following cross-number puzzles on the chalkboard and ask the students to find the missing numbers. For these puzzles they will need both addition and subtraction.

4	5	9
3	3	6
7	8	15

6	3	9
8	7	15
14	10	24

Reinforcement

Flash addition and subtraction fact cards to encourage quick recall of basic facts. This can be followed by a timed fact quiz. Students should record their scores on this quiz and on other fact quizzes given throughout the unit to check their progress.

19. $\begin{array}{r} 436 \\ -297 \\ \hline 139 \end{array}$	20. $\begin{array}{r} 6004 \\ -2377 \\ \hline 3627 \end{array}$	21. $\begin{array}{r} 9027 \\ -6198 \\ \hline 2829 \end{array}$	22. $\begin{array}{r} 7000 \\ -4375 \\ \hline 2625 \end{array}$
--	---	---	---

Subtract. Check by adding.

23. $725 - 166 = 559$ Check: $\begin{array}{r} +166 \\ 725 \end{array}$	24. $806 - 199 = 607$ Check: $\begin{array}{r} +199 \\ 806 \end{array}$	25. $800 - 542 = 258$ Check: $\begin{array}{r} +542 \\ 800 \end{array}$
--	--	--

Add or subtract.

26. $\begin{array}{r} 6.2 \\ +8.5 \\ \hline 14.7 \end{array}$	27. $\begin{array}{r} 3.7 \\ -1.8 \\ \hline 1.9 \end{array}$	28. $\begin{array}{r} 16.59 \\ +7.86 \\ \hline 24.45 \end{array}$	29. $\begin{array}{r} \$72.01 \\ -25.37 \\ \hline \$46.64 \end{array}$
---	--	---	--

Solve

30. An elevator has a 1200 kg capacity. Will office equipment with masses of 376.5 kg, 500 kg, and 320.5 kg overload the elevator? **NO**

Objective A1

Add two-digit numbers, with and without regrouping.

Introducing the Lesson

Review the value of the places of two-digit numbers using base ten number blocks. Show number models similar to the following on the overhead projector and ask the students to name the numbers.



Four tens and eight ones or 48.



Nine tens and three ones or 93.

Teaching the Lesson

Read and discuss the totalling of half time scores required at the top of page 26.

Illustrate the addition with number blocks and record it on the chalkboard.

10s	1s
5 tens	6 ones

10s	1s
3	2
+ 2	4
5	6

Illustrate and record the addition of Brébeuf School's half-time scores, also. Focus attention on the regrouping that is required.

Point out the *commutativity* of the addends in the two text examples. (At this time, students should be made aware of the concept, but should not be held responsible for knowing the term.)

$$\begin{array}{c} \text{Base ten blocks for } 32 + 24 \\ \text{Base ten blocks for } 24 + 32 \end{array}$$

$$32 + 24 = 24 + 32$$

Have individual students explain the trading step in two-place additions, using number blocks. Record the addition algorithm for each at the chalkboard.

Write horizontal additions on the chalkboard and ask the students to calculate the sums *mentally*. Orally dictate additions and have the students mentally calculate the sums.

Two-Place Addition

What is Valley School's total score?

	First Half	Second Half
Valley School	32	24
Brébeuf	26	27

Valley School's total score is 56.

$$\begin{array}{r} 32 \\ + 24 \\ \hline 56 \end{array}$$

What is Brébeuf's total score?

Brébeuf's total score is 53.

$$\begin{array}{r} 26 \\ + 27 \\ \hline 53 \end{array}$$

EXERCISES

Add.

- $\begin{array}{r} 21 \\ + 32 \\ \hline 53 \end{array}$
- $\begin{array}{r} 15 \\ + 23 \\ \hline 38 \end{array}$
- $\begin{array}{r} 82 \\ + 16 \\ \hline 98 \end{array}$
- $\begin{array}{r} 36 \\ + 43 \\ \hline 79 \end{array}$
- $\begin{array}{r} 27 \\ + 32 \\ \hline 59 \end{array}$
- $\begin{array}{r} 4 \\ + 8 \\ \hline 12 \end{array}$
- $\begin{array}{r} 24 \\ + 38 \\ \hline 62 \end{array}$
- $\begin{array}{r} 74 \\ + 18 \\ \hline 92 \end{array}$
- $\begin{array}{r} 48 \\ + 44 \\ \hline 92 \end{array}$
- $\begin{array}{r} 68 \\ + 24 \\ \hline 92 \end{array}$
- $\begin{array}{r} 19 \\ + 15 \\ \hline 34 \end{array}$
- $\begin{array}{r} 28 \\ + 35 \\ \hline 63 \end{array}$
- $\begin{array}{r} 34 \\ + 27 \\ \hline 61 \end{array}$
- $\begin{array}{r} 33 \\ + 17 \\ \hline 50 \end{array}$
- $\begin{array}{r} 35 \\ + 29 \\ \hline 64 \end{array}$
- $40 + 30 = 70$
- $24 + 36 = 60$
- $57 + 38 = 95$

Using the Exercises

- Questions 1 to 5 involve no regrouping. In question 6 a basic fact is reviewed; it is then used in questions 7 to 10 which are additions requiring regrouping.
- Questions 11 to 15 provide practice in addition with regrouping. In questions 16 to 18, the problems are given horizontally. Check that the students rewrite them aligning them properly.

PRACTICE

Add.

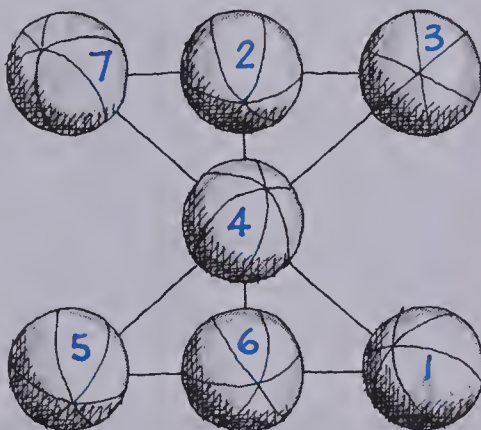
1. $\begin{array}{r} 41 \\ + 19 \\ \hline 60 \end{array}$
2. $\begin{array}{r} 37 \\ + 16 \\ \hline 53 \end{array}$
3. $\begin{array}{r} 73 \\ + 25 \\ \hline 98 \end{array}$
4. $\begin{array}{r} 57 \\ + 28 \\ \hline 85 \end{array}$
5. $\begin{array}{r} 67 \\ + 27 \\ \hline 94 \end{array}$
6. $\begin{array}{r} 29 \\ + 24 \\ \hline 53 \end{array}$
7. $\begin{array}{r} 29 \\ + 25 \\ \hline 54 \end{array}$
8. $\begin{array}{r} 29 \\ + 26 \\ \hline 55 \end{array}$
9. $\begin{array}{r} 57 \\ + 14 \\ \hline 71 \end{array}$
10. $\begin{array}{r} 79 \\ + 18 \\ \hline 97 \end{array}$
11. $\begin{array}{r} 42 \\ + 42 \\ \hline 84 \end{array}$
12. $\begin{array}{r} 58 \\ + 23 \\ \hline 81 \end{array}$
13. $\begin{array}{r} 27 \\ + 13 \\ \hline 40 \end{array}$
14. $\begin{array}{r} 37 \\ + 23 \\ \hline 60 \end{array}$
15. $\begin{array}{r} 47 \\ + 33 \\ \hline 80 \end{array}$
16. $36 + 49 = 85$
17. $58 + 27 = 85$
18. $45 + 35 = 80$

Solve.

19. Paul scored 38 points in the first game and 24 points in the second game. How many points did he score all together? **62**
20. Mina played 14 minutes in the first game and 16 minutes in the second game. How many minutes did she play in all? **30 min**
21. Write a story problem that can be solved by adding 28 and 35.

Basketball Bonanza

Copy the drawing. Write the numbers 1 to 7 on the basketballs so that the numbers in each row of three circles — vertical, horizontal, and diagonal — add up to 12. Use each number only once.



There are several possibilities.

27

Assigning the Practice

Minimum: 1-19

Average: 1-21

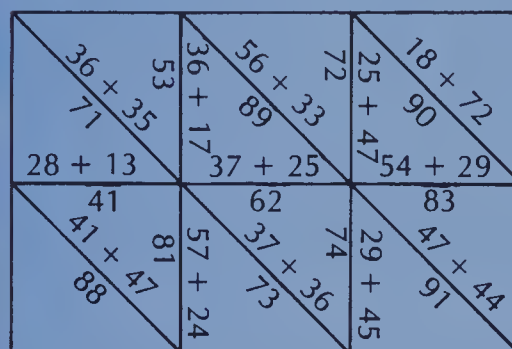
Enriched: 6-21

Reinforcement

1. Write the following problems on the chalkboard and ask the students to explain the mistakes and to redo the problems correctly.

$$\begin{array}{r} 23 \\ + 18 \\ \hline 311 \end{array} \quad \begin{array}{r} 42 \\ + 38 \\ \hline 710 \end{array} \quad \begin{array}{r} 66 \\ + 23 \\ \hline 99 \end{array} \quad \begin{array}{r} 73 \\ + 14 \\ \hline 744 \end{array}$$

2. Prepare the following worksheet puzzle. Students are to cut out the pieces, reassemble them, and glue them to stiff paper.



Enrichment

1. Assign *Basketball Bonanza* at the bottom of page 27. Better students should be able to find several possibilities.
2. Ask the students to replace ■ and ▲ with digits so that the additions are correct.

$$\begin{array}{r} 3 \blacksquare 39 \\ + 4 \blacktriangle 49 \\ \hline 88 \end{array} \quad \begin{array}{r} \blacksquare 9 19 \\ + 5 \blacktriangle 57 \\ \hline 76 \end{array} \quad \begin{array}{r} \blacksquare 8 48 \\ + 3 \blacktriangle 38 \\ \hline 86 \end{array}$$

$$\begin{array}{r} 2 \blacksquare 28 \\ + \blacktriangle 9 49 \\ \hline 77 \end{array} \quad \begin{array}{r} 4 \blacktriangle 46 \\ + \blacksquare 5 45 \\ \hline 91 \end{array} \quad \begin{array}{r} \blacksquare 6 26 \\ + 6 \blacktriangle 69 \\ \hline 95 \end{array}$$

3. Give the students a die labelled 0, 1, 2, 3, 4, and 5 and another labelled 4, 5, 6, 7, 8, and 9. Have the students roll the dice to form two-digit numbers. When two 2-digit numbers have been rolled, the students mentally add them and write down only the sum. The first student with the correct answer gets a point. The student with the most points wins.

Extra Practice

Add.

1. $\begin{array}{r} 16 \\ + 23 \\ \hline 39 \end{array}$
2. $\begin{array}{r} 62 \\ + 19 \\ \hline 81 \end{array}$
3. $\begin{array}{r} 39 \\ + 60 \\ \hline 99 \end{array}$
4. $\begin{array}{r} 14 \\ + 75 \\ \hline 89 \end{array}$
5. $\begin{array}{r} 21 \\ + 58 \\ \hline 79 \end{array}$
6. $\begin{array}{r} 27 \\ + 43 \\ \hline 70 \end{array}$
7. $\begin{array}{r} 54 \\ + 12 \\ \hline 66 \end{array}$
8. $\begin{array}{r} 58 \\ + 29 \\ \hline 87 \end{array}$
9. $\begin{array}{r} 73 \\ + 25 \\ \hline 98 \end{array}$
10. $\begin{array}{r} 64 \\ + 27 \\ \hline 91 \end{array}$
11. $17 + 82 = 99$
12. $38 + 48 = 86$
13. $29 + 68 = 97$
14. $43 + 47 = 90$
15. $18 + 26 = 44$
16. $53 + 29 = 82$

Solve.

17. Mandy played 19 minutes in the first half of the soccer game and 23 minutes in the second half. How many minutes did she play in all?

42 min

Worksheet A1

Pages 26-27

Objective A2

Add three-digit numbers, with and without regrouping.

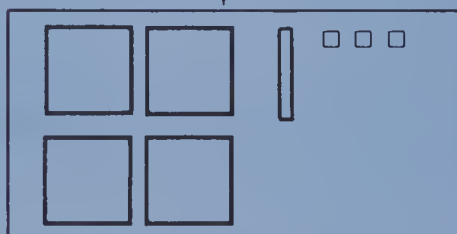
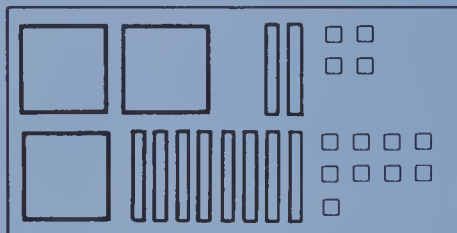
Introducing the Lesson

Begin a discussion about baseball. Talk about favourite teams and about experiences the students have had with the sport. Bring in baseball statistics from the local newspaper and discuss them. Students who play baseball regularly may also report their own statistics.

Teaching the Lesson

Point out the problem at the top of page 28. Illustrate the addition and the two regrouping steps with number blocks.

1. Regroup 13 ones as 1 ten and 3 ones.
2. Regroup 11 tens as 1 hundred and 1 ten.



100s	10s	1s
1	1	
2	2	4
+1	8	9

Using the baseball statistics discussed earlier, formulate several three-place additions for the students to illustrate and record. Point out the commutativity of the addends. Encourage the students to *round addends* and estimate sums. Write several three-place additions on the chalkboard and ask for the *estimated sum*.

Three-Place Addition

The shortstop has 224 base hits so far this season. The second baseman has 189 hits. How many hits do they have altogether?



Add ones.

$$\begin{array}{r} 1 \\ 224 \\ +189 \\ \hline 3 \end{array}$$

Add tens.

$$\begin{array}{r} 11 \\ 224 \\ +189 \\ \hline 13 \end{array}$$

Add hundreds.

$$\begin{array}{r} 11 \\ 224 \\ +189 \\ \hline 413 \end{array}$$

$$\begin{array}{r} 11 \\ 224 \\ +189 \\ \hline 413 \end{array}$$

Together they have 413 hits.

EXERCISES

Add.

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 230 \\ +341 \\ \hline 571 \end{array}$ | 2. $\begin{array}{r} 729 \\ +170 \\ \hline 899 \end{array}$ | 3. $\begin{array}{r} 545 \\ +218 \\ \hline 763 \end{array}$ | 4. $\begin{array}{r} 327 \\ +118 \\ \hline 445 \end{array}$ | 5. $\begin{array}{r} 409 \\ +328 \\ \hline 737 \end{array}$ |
| 6. $\begin{array}{r} 230 \\ +290 \\ \hline 520 \end{array}$ | 7. $\begin{array}{r} 352 \\ +272 \\ \hline 624 \end{array}$ | 8. $\begin{array}{r} 98 \\ +21 \\ \hline 119 \end{array}$ | 9. $\begin{array}{r} 66 \\ +82 \\ \hline 148 \end{array}$ | 10. $\begin{array}{r} 47 \\ +77 \\ \hline 124 \end{array}$ |
| 11. $\begin{array}{r} 249 \\ +298 \\ \hline 547 \end{array}$ | 12. $\begin{array}{r} 478 \\ +286 \\ \hline 764 \end{array}$ | 13. $\begin{array}{r} 347 \\ +277 \\ \hline 624 \end{array}$ | 14. $\begin{array}{r} 525 \\ +195 \\ \hline 720 \end{array}$ | 15. $\begin{array}{r} 676 \\ +288 \\ \hline 964 \end{array}$ |
| 16. $329 + 516 = 845$ | 17. $752 + 164 = 916$ | 18. $495 + 326 = 821$ | | |

Using the Exercises

- Questions 1 to 18 provide a developmental plan for adding three-digit numbers. Questions 1 and 2 have no regrouping; questions 3, 4, and 5 involve regrouping ones; questions 6, 7, 8, and 9 involve regrouping tens; and questions 10 to 15 involve regrouping both ones and tens.

PRACTICE

Add.

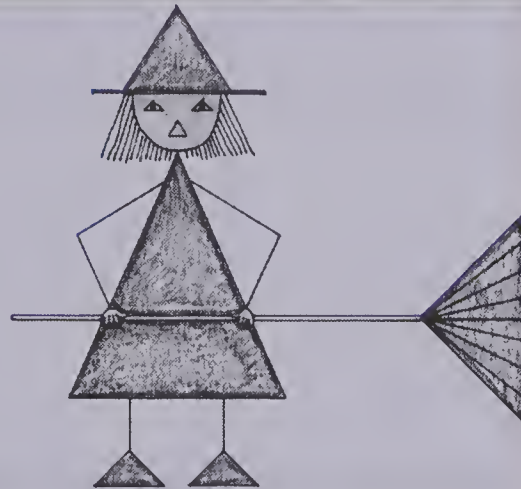
- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 461 \\ + 234 \\ \hline 695 \end{array}$ | 2. $\begin{array}{r} 328 \\ + 333 \\ \hline 661 \end{array}$ | 3. $\begin{array}{r} 252 \\ + 363 \\ \hline 615 \end{array}$ | 4. $\begin{array}{r} 474 \\ + 336 \\ \hline 810 \end{array}$ | 5. $\begin{array}{r} 444 \\ + 366 \\ \hline 810 \end{array}$ |
| 6. $\begin{array}{r} 314 \\ + 399 \\ \hline 713 \end{array}$ | 7. $\begin{array}{r} 681 \\ + 275 \\ \hline 956 \end{array}$ | 8. $\begin{array}{r} 303 \\ + 227 \\ \hline 530 \end{array}$ | 9. $\begin{array}{r} 199 \\ + 299 \\ \hline 498 \end{array}$ | 10. $\begin{array}{r} 505 \\ + 295 \\ \hline 800 \end{array}$ |
| 11. $\begin{array}{r} 462 \\ + 393 \\ \hline 855 \end{array}$ | 12. $\begin{array}{r} 112 \\ + 569 \\ \hline 681 \end{array}$ | 13. $\begin{array}{r} 278 \\ + 212 \\ \hline 490 \end{array}$ | 14. $\begin{array}{r} 569 \\ + 112 \\ \hline 681 \end{array}$ | 15. $\begin{array}{r} 89 \\ + 41 \\ \hline 130 \end{array}$ |
| 16. $\begin{array}{r} 585 \\ + 363 \\ \hline 948 \end{array}$ | 17. $\begin{array}{r} 370 \\ + 81 \\ \hline 451 \end{array}$ | 18. $\begin{array}{r} 588 \\ + 26 \\ \hline 614 \end{array}$ | 19. $\begin{array}{r} 247 \\ + 505 \\ \hline 752 \end{array}$ | 20. $\begin{array}{r} 794 \\ + 76 \\ \hline 870 \end{array}$ |
| 21. $754 + 692 = 1446$ | 22. $645 + 28 = 673$ | 23. $574 + 96 = 670$ | | |

Solve.

24. On Friday, 452 people watched the little league game. On Saturday, 374 people watched. How many people watched on both days? **826**

Three-Sided Witch

How many triangles can you find? **44**



Now draw a "three-sided cat"

29

Assigning the Practice

Minimum: 1-15, 21-22

Average: 1-24

Enriched: 6-24

Reinforcement

1. Ask the students to explain the mistakes in these additions.

a. $\begin{array}{r} 247 \\ + 683 \\ \hline 920 \end{array}$	b. $\begin{array}{r} 147 \\ + 658 \\ \hline 895 \end{array}$	c. $\begin{array}{r} 209 \\ + 291 \\ \hline 410 \end{array}$
--	--	--

2. Have the students round the addends to the nearest hundred and find the estimated sum. The correct answers will decode the name of a Canadian baseball team.

- | | |
|--------------------|--------------------|
| a. $532 + 114 = Y$ | b. $477 + 317 = B$ |
| c. $157 + 255 = S$ | d. $492 + 222 = J$ |
| e. $202 + 13 = U$ | f. $177 + 196 = L$ |
| g. $631 + 272 = E$ | h. $119 + 187 = A$ |

B 800	L 400	U 200	E 900
J 700	A 300	Y 600	S 500

Enrichment

1. Assign *Three-Sided Witch* at the bottom of page 29. Display the "three-sided cats" the students make and use them as puzzles for the rest of the class to solve.

2. Direct the student to replace ■, ● and ▲ with digits so that the addition is correct.

a. $\begin{array}{r} 4 \\ \blacksquare 75 \\ + 3 \bullet 8 \\ \hline 84 \blacktriangle 3 \end{array}$	b. $\begin{array}{r} 7 \\ 32 \blacksquare \\ + 4 \bullet 6 \\ \hline \blacktriangle 63 \end{array}$	c. $\begin{array}{r} 6 \ 8 \\ \blacksquare 7 \bullet \\ + 8 \blacktriangle 2 \\ \hline 1520 \end{array}$
---	---	--

3. Cut out articles from the sports pages and ask the students to make up word problems using information from the articles. These problems can be displayed and solved by the rest of the class.

Extra Practice

Add.

- | | | | | |
|--|---|--|--|---|
| 1. $\begin{array}{r} 427 \\ + 532 \\ \hline 959 \end{array}$ | 2. $\begin{array}{r} 218 \\ + 875 \\ \hline 1093 \end{array}$ | 3. $\begin{array}{r} 341 \\ + 260 \\ \hline 601 \end{array}$ | 4. $\begin{array}{r} 163 \\ + 119 \\ \hline 282 \end{array}$ | 5. $\begin{array}{r} 486 \\ + 274 \\ \hline 760 \end{array}$ |
| 6. $\begin{array}{r} 199 \\ + 299 \\ \hline 498 \end{array}$ | 7. $\begin{array}{r} 352 \\ + 473 \\ \hline 825 \end{array}$ | 8. $\begin{array}{r} 547 \\ + 365 \\ \hline 912 \end{array}$ | 9. $\begin{array}{r} 281 \\ + 319 \\ \hline 600 \end{array}$ | 10. $\begin{array}{r} 316 \\ + 194 \\ \hline 510 \end{array}$ |
| 11. $725 + 153 = 878$ | 12. $685 + 217 = 902$ | 13. $175 + 645 = 820$ | | |

Round to the nearest hundred. Write an estimated sum.

- | | | |
|--|--|---|
| 14. $412 + 395 = \underline{\quad}$
$400 + 400 = 800$ | 15. $655 + 232 = \underline{\quad}$
$700 + 200 = 900$ | 16. $789 + 192 = \underline{\quad}$
$800 + 200 = 1000$ |
|--|--|---|

Solve.

17. The girls from Lansing School scored 335 points at the track meet and the boys scored 329 points. What was the total number of points scored by Lansing School? **664 points**

Worksheet A2

Pages 28-29

PRACTICE

Add.

$$\begin{array}{r} 1. \quad 4 \\ 3 \\ +2 \\ \hline 9 \end{array} \quad \begin{array}{r} 2. \quad 4 \\ 5 \\ +7 \\ \hline 16 \end{array} \quad \begin{array}{r} 3. \quad 5 \\ 7 \\ +6 \\ \hline 18 \end{array} \quad \begin{array}{r} 4. \quad 5 \\ 5 \\ +3 \\ \hline 13 \end{array} \quad \begin{array}{r} 5. \quad 5 \\ 6 \\ +4 \\ \hline 15 \end{array}$$

$$6. \quad 3 + 9 + 7 = 19 \quad 7. \quad 6 + 7 + 2 = 15 \quad 8. \quad 4 + 8 + 9 = 21$$

$$\begin{array}{r} 9. \quad 12 \\ 46 \\ +11 \\ \hline 69 \end{array} \quad \begin{array}{r} 10. \quad 84 \\ 47 \\ +62 \\ \hline 193 \end{array} \quad \begin{array}{r} 11. \quad 29 \\ 24 \\ +21 \\ \hline 74 \end{array} \quad \begin{array}{r} 12. \quad 75 \\ 46 \\ +5 \\ \hline 126 \end{array} \quad \begin{array}{r} 13. \quad 38 \\ 37 \\ +6 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 14. \quad 77 \\ 66 \\ +55 \\ \hline 198 \end{array} \quad \begin{array}{r} 15. \quad 28 \\ 82 \\ +28 \\ \hline 138 \end{array} \quad \begin{array}{r} 16. \quad 56 \\ 89 \\ +11 \\ \hline 156 \end{array} \quad \begin{array}{r} 17. \quad 17 \\ 8 \\ +29 \\ \hline 54 \end{array} \quad \begin{array}{r} 18. \quad 62 \\ 7 \\ +13 \\ \hline 82 \end{array}$$

$$19. \quad 12 + 9 + 41 = 62 \quad 20. \quad 53 + 19 + 2 = 74 \quad 21. \quad 45 + 7 + 12 = 64$$

Solve.

22. Ivan's hockey team has 2 goalies, 6 defencemen, and 9 forwards. How many players are on his team? **17 players**
23. What is the total number of shots on goal for the Montreal Canadiens? (Use the chart on p. 30.) **45 shots**

Magic Square

Which square is a *magic square*? Write the magic sum.

A.

55	62	57
60	58	56
59	54	61

174

B.

55	57	62
60	58	56
59	54	61

Not a magic square

31

Assigning the Practice

Minimum: 1-13, 19, 22

Average: 6-23

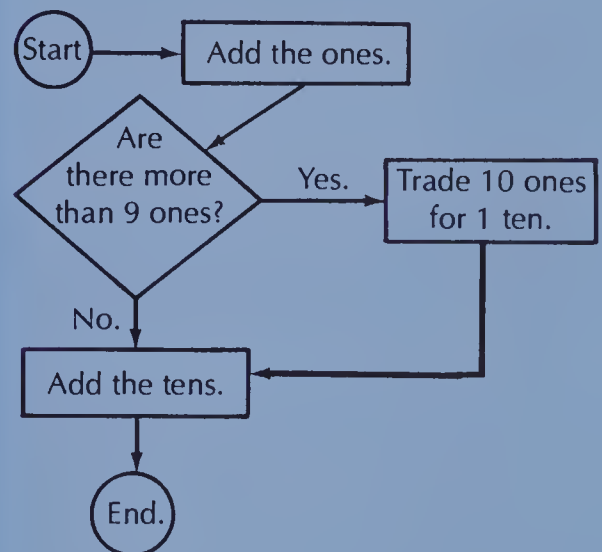
Enriched: 9-23

Reinforcement

- Assign *Magic Square* at the bottom of page 31. Have the students explain why the second figure is not a magic square.
- Play Bingo with problems having three one-digit addends. Have the students place the numbers from 3 to 27 in their 5 by 5 grid cards. Say three single-digit numbers. The students mentally compute the sum and mark that number with a bean. "Bingo" is called out when someone has five beans horizontally, vertically, or diagonally.

Enrichment

- Encourage the students to make up magic square figures. Ask the rest of the class to determine the magic sum (if any).
- Have the students work in a group. One student recites eight or more one-digit addends, while the other students mentally compute the sum. The first student with the correct sum is the next leader.
- Explain how a flow chart provides a clear picture of the steps of a particular task. Show the following flow chart for regrouping ones in addition. Ask the students to devise a flow chart for adding three numbers.



Extra Practice

Add.

$$\begin{array}{r} 1. \quad 5 \\ 2 \\ +1 \\ \hline 8 \end{array} \quad \begin{array}{r} 2. \quad 5 \\ 8 \\ +5 \\ \hline 18 \end{array} \quad \begin{array}{r} 3. \quad 4 \\ 6 \\ +9 \\ \hline 19 \end{array} \quad \begin{array}{r} 4. \quad 7 \\ 7 \\ +6 \\ \hline 20 \end{array} \quad \begin{array}{r} 5. \quad 9 \\ 8 \\ +2 \\ \hline 19 \end{array}$$

$$\begin{array}{r} 6. \quad 22 \\ 6 \\ +44 \\ \hline 72 \end{array} \quad \begin{array}{r} 7. \quad 84 \\ 14 \\ +35 \\ \hline 133 \end{array} \quad \begin{array}{r} 8. \quad 73 \\ 84 \\ +27 \\ \hline 184 \end{array} \quad \begin{array}{r} 9. \quad 39 \\ 46 \\ +21 \\ \hline 106 \end{array} \quad \begin{array}{r} 10. \quad 25 \\ 31 \\ +84 \\ \hline 140 \end{array}$$

Round to the nearest ten. Write the estimated sum.

$$11. \quad 14 + 77 + 29 = \underline{\quad} \quad 12. \quad 34 + 65 + 48 = \underline{\quad}$$

$$10 + 80 + 30 = 120 \quad 30 + 70 + 50 = 150$$

Solve.

13. A soccer team has 1 goalie, 3 fullbacks, 3 halfbacks, and 4 forwards. How many players do they have? **11 players**

Worksheet A3

Pages 30-31

UNIT 2 LESSON 4

Objective A4

Add four- and five-digit numbers.

Introducing the Lesson

Discuss the sport of mountain climbing. If possible, show some pictures of the sport from magazines. Talk about the equipment needed, problems that could happen, and places where mountain climbing is done. Ask if any students have had experience with mountain climbing.

Teaching the Lesson

Point out the problem at the top of page 32. Explain the regrouping steps of the addition with a place-value pocket chart and record them on the chalkboard.

1000s	100s	10s	1s

1. Regroup the 10 ones as 1 ten and 0 ones.
2. Regroup the 16 tens as 1 hundred and 6 tens.
3. Regroup the 11 hundreds as 1 thousand and 1 hundred.
4. Add the thousands.

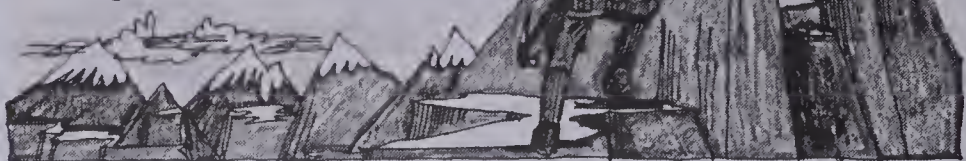
1000s	100s	10s	1s
1	1	1	
2	1	7	5
+1	9	8	5
4	1	6	0

Provide practice with several other additions of two or three, four- or five-digit numerals. Stress the importance of proper number alignment. Students having difficulty with alignment should do their additions on graph paper.

1	2		1	1	
6	7		4	7	5
			8	2	6
	9		7	5	1
7	8		0	5	2

Adding Larger Numbers

A climber's route to the top of a mountain was 2175 m long. His trip down was 1985 m long. What was the total length of the two routes?



	Add ones.	Add tens.	Add hundreds.	Add thousands.
2175 +1985	$\begin{array}{r} 1 \\ 2175 \\ +1985 \\ \hline 0 \end{array}$	$\begin{array}{r} 11 \\ 2175 \\ +1985 \\ \hline 60 \end{array}$	$\begin{array}{r} 111 \\ 2175 \\ +1985 \\ \hline 160 \end{array}$	$\begin{array}{r} 111 \\ 2175 \\ +1985 \\ \hline 4160 \end{array}$

The total length of the two routes was 4160 m.

EXERCISES				
1. $\begin{array}{r} 3438 \\ +2149 \\ \hline 5587 \end{array}$	2. $\begin{array}{r} 1137 \\ +5491 \\ \hline 6628 \end{array}$	3. $\begin{array}{r} 2831 \\ +4203 \\ \hline 7034 \end{array}$	4. $\begin{array}{r} 4375 \\ +2106 \\ \hline 6481 \end{array}$	5. $\begin{array}{r} 3951 \\ +4322 \\ \hline 8273 \end{array}$
6. $\begin{array}{r} 8461 \\ +757 \\ \hline 9218 \end{array}$	7. $\begin{array}{r} 5871 \\ +1453 \\ \hline 7324 \end{array}$	8. $\begin{array}{r} 752 \\ +662 \\ \hline 1414 \end{array}$	9. $\begin{array}{r} 6375 \\ +8166 \\ \hline 14541 \end{array}$	10. $\begin{array}{r} 3716 \\ +6905 \\ \hline 10621 \end{array}$
11. $\begin{array}{r} 70152 \\ +26940 \\ \hline 97092 \end{array}$	12. $\begin{array}{r} 19164 \\ +62381 \\ \hline 81545 \end{array}$	13. $\begin{array}{r} 27519 \\ +2506 \\ \hline 30025 \end{array}$	14. $\begin{array}{r} 43887 \\ +1056 \\ \hline 44943 \end{array}$	
15. $\begin{array}{r} 73274 \\ +61315 \\ \hline 134589 \end{array}$	16. $\begin{array}{r} 39145 \\ +82923 \\ \hline 122068 \end{array}$	17. $\begin{array}{r} 826 \\ 795 \\ +477 \\ \hline 2098 \end{array}$	18. $\begin{array}{r} 65911 \\ 8435 \\ +276 \\ \hline 74622 \end{array}$	

32

Using the Exercises

- Questions 1 to 10 provide practice in adding four-digit numbers. The first five are problems that involve only one regrouping; the second five problems involve two regroupings.
- Questions 11 to 16 provide practice in adding five-digit numbers. In questions 17 and 18, there are three addends.
- Check the students' work for proper number alignment, especially when the addends do not have the same number of digits, as in questions 6, 13, 14, and 18.

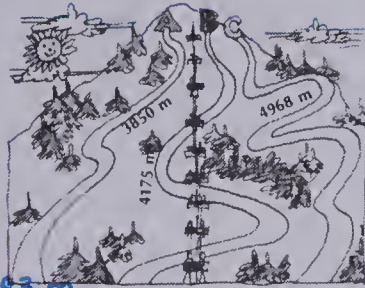
PRACTICE

Add.

- | | | | |
|--|--|---|---|
| 1. $\begin{array}{r} 3756 \\ + 2134 \\ \hline 5890 \end{array}$ | 2. $\begin{array}{r} 4562 \\ + 3836 \\ \hline 8398 \end{array}$ | 3. $\begin{array}{r} 6544 \\ + 3456 \\ \hline 10\ 000 \end{array}$ | 4. $\begin{array}{r} 2985 \\ + 3271 \\ \hline 6256 \end{array}$ |
| 5. $\begin{array}{r} 5172 \\ + 853 \\ \hline 6025 \end{array}$ | 6. $\begin{array}{r} 9953 \\ + 327 \\ \hline 10\ 280 \end{array}$ | 7. $\begin{array}{r} 65\ 184 \\ + 322 \\ \hline 65\ 506 \end{array}$ | 8. $\begin{array}{r} 91\ 585 \\ + 7\ 493 \\ \hline 99\ 078 \end{array}$ |
| 9. $\begin{array}{r} 26\ 147 \\ + 35\ 870 \\ \hline 62\ 017 \end{array}$ | 10. $\begin{array}{r} 34\ 921 \\ + 87\ 032 \\ \hline 121\ 953 \end{array}$ | 11. $\begin{array}{r} 67\ 195 \\ 236 \\ + 6\ 141 \\ \hline 73\ 572 \end{array}$ | 12. $\begin{array}{r} 49\ 329 \\ 58\ 926 \\ + 135 \\ \hline 108\ 390 \end{array}$ |

Solve.

13. Linda skied down trail B and trail C one morning. How many metres did she ski in all? **9143 m**
14. Jeremy skied down trails A and B. How many metres was that in all? **8025 m**
15. Eric skied down all three trails. How many metres was that in all? **12 993 m**



REVIEW

Add.

- | | | | |
|----|--|---|---|
| A1 | 1. $36 + 29$ 65 | 2. $55 + 37$ 92 | 3. $62 + 17$ 79 |
| A2 | 4. $\begin{array}{r} 524 \\ + 175 \\ \hline 699 \end{array}$ | 5. $\begin{array}{r} 242 \\ + 398 \\ \hline 640 \end{array}$ | 6. $\begin{array}{r} 84 \\ + 906 \\ \hline 990 \end{array}$ |
| A3 | 8. $9 + 6 + 4$ 19 | 9. $86 + 27 + 32$ 145 | 10. $45 + 9 + 26$ 80 |
| A4 | 11. $\begin{array}{r} 4135 \\ + 1672 \\ \hline 5807 \end{array}$ | 12. $\begin{array}{r} 73\ 123 \\ + 11\ 962 \\ \hline 85\ 085 \end{array}$ | 13. $\begin{array}{r} 6773 \\ + 342 \\ \hline 7115 \end{array}$ |

33

Assigning the Practice

Minimum: 1-8, 13

Average: 1-13

Enriched: 5-15

Review Exercises

Questions	Objective	Pages
1-3	A1	26-27
4-7	A2	28-29
8-10	A3	30-31
11-14	A4	32-33

Reinforcement

Have a contest between two teams of students to see which team has more speed or more accuracy in adding. Team A works their additions with pencil and paper. Team B uses calculators. Dictate additions of two and three addends having four or five digits.

Enrichment

1. Show the students how to check addition by **casting out nines**. In each number, the digits adding to 9 are crossed out. The remaining digits are added and the sums listed on the right. These numbers are then added (casting out nines first). The sum should match the digit left over after casting out nines in the original sum.

$$\begin{array}{r} \cancel{8}7\cancel{8}8 - \cancel{1} \\ \cancel{2}2\cancel{1}6 - \cancel{2} \\ + \cancel{8}9\cancel{8}8 - \cancel{0} \\ \hline \cancel{1}7\cancel{8}1\cancel{0} - \cancel{0} \end{array} \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 0$$

The sum is correct.

2. Ask the students to find a short cut for adding 9999 and 5368.

Note: 9999 is one less than 10 000

$$5368 + 10\ 000 = 15\ 368$$

$$15\ 368 - 1 = 15\ 367$$

$$\text{So, } 5368 + 9999 = 15\ 367$$

Ask the students to answer these questions involving short cut additions.

a. Add 9999 twice to 5368. Compare your answer with 5368. What do you notice?

$$9999 + 9999 + 5368 = 25\ 366$$

b. Add 9999 three times to 5368. Compare your answer with 5368. What do you notice?

$$9999 + 9999 + 9999 + 5368 = 35\ 366$$

Extra Practice

Add.

- | | | | |
|--|--|--|---|
| 1. $\begin{array}{r} 47 \\ + 38 \\ \hline 85 \end{array}$ | 2. $\begin{array}{r} 475 \\ + 382 \\ \hline 857 \end{array}$ | 3. $\begin{array}{r} 2479 \\ + 383 \\ \hline 2862 \end{array}$ | 4. $\begin{array}{r} 4793 \\ + 3836 \\ \hline 8629 \end{array}$ |
| 5. $\begin{array}{r} 361 \\ 490 \\ + 589 \\ \hline 1440 \end{array}$ | 6. $\begin{array}{r} 247 \\ 334 \\ + 431 \\ \hline 1012 \end{array}$ | 7. $\begin{array}{r} 32\ 432 \\ 4\ 356 \\ + 24\ 362 \\ \hline 61\ 150 \end{array}$ | 8. $\begin{array}{r} 84\ 567 \\ 32\ 432 \\ + 4\ 568 \\ \hline 121\ 567 \end{array}$ |

Round to the nearest thousand. Write the estimated sum.

9. $2275 + 1854 + 6977 =$ **$2000 + 2000 + 7000 = 11\ 000$**
10. $8654 + 4178 + 3939 =$ **$9000 + 4000 + 4000 = 17\ 000$**

Solve.

11. At the track meet there were 373 men, 479 women, 642 boys, and 673 girls. How many people attended? **2167 people**

Worksheet A4


Pages 32-33

Objective A5

Subtract two-digit numbers, with regrouping.

Introducing the Lesson

Show the following number blocks for the students to regroup.


 is the same as 3 rods and ? cubes.

Trade 1 rod for 10 cubes. 

4 rods and 2 cubes = 3 rods and 12 cubes.

10s	1s	→	10s	1s
4	2		3	12

Have the students illustrate several similar examples and record the trading at the chalkboard.

5 rods and 3 cubes
= 4 rods and ? cubes 

Teaching the Lesson

Read and discuss the problem at the top of page 34. Point out that subtraction is needed to find how much further they have to go. Illustrate the subtraction with number blocks and record the algorithm on the chalkboard.

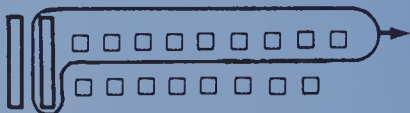
Take 1 rod and 9 cubes away from the following set.



Since there are not enough cubes, trade 1 rod for 10 cubes.



Take away 1 rod and 9 cubes.

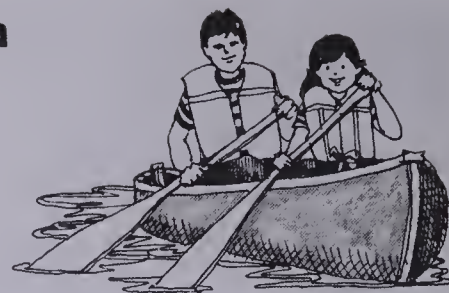


1 rod and 8 cubes are left.

Explain that subtraction can be checked by adding the **difference** to the **subtrahend** to get the **minuend**.

Two-Place Subtraction

Marta and her father are on a 37 km canoe trip. They have travelled 19 km so far. How much farther do they have to go?



Regroup tens and ones. Subtract ones. Subtract tens.

$$\begin{array}{r} 37 \\ - 19 \\ \hline \end{array}$$

They have 18 km left to go.

$$\begin{array}{r} 217 \\ 37 \\ - 19 \\ \hline \end{array}$$

$$\begin{array}{r} 217 \\ 37 \\ - 19 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 217 \\ 37 \\ - 19 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 217 \\ 37 \\ - 19 \\ \hline 18 \end{array}$$

Check: $18 + 19 = 37$

EXERCISES

Subtract.

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 82 \\ - 9 \\ \hline 73 \end{array}$ | 2. $\begin{array}{r} 32 \\ - 9 \\ \hline 23 \end{array}$ | 3. $\begin{array}{r} 52 \\ - 19 \\ \hline 33 \end{array}$ | 4. $\begin{array}{r} 72 \\ - 39 \\ \hline 33 \end{array}$ | 5. $\begin{array}{r} 92 \\ - 69 \\ \hline 23 \end{array}$ |
| 6. $\begin{array}{r} 25 \\ - 7 \\ \hline 18 \end{array}$ | 7. $\begin{array}{r} 45 \\ - 7 \\ \hline 38 \end{array}$ | 8. $\begin{array}{r} 65 \\ - 17 \\ \hline 48 \end{array}$ | 9. $\begin{array}{r} 95 \\ - 37 \\ \hline 58 \end{array}$ | 10. $\begin{array}{r} 55 \\ - 47 \\ \hline 8 \end{array}$ |
| 11. $\begin{array}{r} 34 \\ - 17 \\ \hline 17 \end{array}$ | 12. $\begin{array}{r} 73 \\ - 54 \\ \hline 19 \end{array}$ | 13. $\begin{array}{r} 88 \\ - 57 \\ \hline 31 \end{array}$ | 14. $\begin{array}{r} 60 \\ - 32 \\ \hline 28 \end{array}$ | 15. $\begin{array}{r} 80 \\ - 41 \\ \hline 39 \end{array}$ |
| 16. $\begin{array}{r} 71 \\ - 26 \\ \hline 45 \end{array}$ | 17. $\begin{array}{r} 42 \\ - 29 \\ \hline 13 \end{array}$ | 18. $\begin{array}{r} 66 \\ - 38 \\ \hline 28 \end{array}$ | 19. $\begin{array}{r} 90 \\ - 47 \\ \hline 43 \end{array}$ | 20. $\begin{array}{r} 58 \\ - 47 \\ \hline 11 \end{array}$ |

Subtract. Check by adding.

21. $73 - 58$ **15** 22. $50 - 22$ **28** 23. $67 - 19$ **48** 24. $81 - 47$ **34**

Using the Exercises

- Questions 1 to 5 and 6 to 10 each use basic subtraction facts. This is so that students can concentrate solely on the regrouping procedure.
- Questions 11 to 20 provide practice with two-place subtraction and use many basic facts.
- Questions 21 to 24 present the subtraction horizontally. Checking the results is required.

PRACTICE

Find the difference.

1. $\begin{array}{r} 90 \\ -26 \\ \hline 64 \end{array}$
2. $\begin{array}{r} 66 \\ -59 \\ \hline 7 \end{array}$
3. $\begin{array}{r} 31 \\ -18 \\ \hline 13 \end{array}$
4. $\begin{array}{r} 60 \\ -37 \\ \hline 23 \end{array}$
5. $\begin{array}{r} 75 \\ -65 \\ \hline 10 \end{array}$
6. $90 - 17 = 73$
7. $81 - 42 = 39$
8. $63 - 36 = 27$
9. $48 - 29 = 19$
10. $\begin{array}{r} 82 \\ -46 \\ \hline 36 \end{array}$
11. $\begin{array}{r} 75 \\ -64 \\ \hline 11 \end{array}$
12. $\begin{array}{r} 71 \\ -49 \\ \hline 22 \end{array}$
13. $\begin{array}{r} 86 \\ -27 \\ \hline 59 \end{array}$
14. $\begin{array}{r} 91 \\ -38 \\ \hline 53 \end{array}$

Subtract. Check by adding.

15. $50 - 14 = 36$
16. $63 - 48 = 15$
17. $85 - 46 = 39$
18. $93 - 57 = 36$
19. $\begin{array}{r} 48 \\ -39 \\ \hline 9 \end{array}$
20. $\begin{array}{r} 65 \\ -27 \\ \hline 38 \end{array}$
21. $\begin{array}{r} 35 \\ -9 \\ \hline 26 \end{array}$
22. $\begin{array}{r} 88 \\ -18 \\ \hline 70 \end{array}$
23. $\begin{array}{r} 66 \\ -49 \\ \hline 17 \end{array}$

Solve.

24. Peter canoed 19 km, while Nick canoed 23 km. How much farther did Nick canoe? **4 km**
25. Forty-two boys and twenty-three girls went canoeing. How many more boys than girls went canoeing? **19**
26. Jenny and Lynn paddled upstream for 45 min and then paddled back to camp. The trip took them an hour. How long did it take them to paddle back? **15 min**

Letter Logic

Each different letter below stands for a different digit. Discover the code and rewrite the problems with numerals.

$$\begin{array}{r} DD \\ + EE \\ \hline CEC \end{array} \quad \begin{array}{r} 99 \\ + 22 \\ \hline 121 \end{array}$$

$$\begin{array}{r} B6B \\ + B6C \\ \hline CCE6 \end{array} \quad \begin{array}{r} 565 \\ + 561 \\ \hline 1126 \end{array}$$

35

Assigning the Practice

Minimum: 1-18, 25, 26

Average: 1-26

Enriched: 6-26

Reinforcement

1. Give each pair of students two dice. The students roll the dice twice. With each roll a two-digit number is formed. Both students are to subtract the smaller number from the larger. The results are then compared.

2. Prepare and display the following cards and other similar ones for the students to solve.

What is the difference between 25 min and 1 h? **35 min**

How much longer is 72 cm than 58 cm? **14 cm**

How much less is 19 than 45? **26**

How much farther is 90 km than 47 km? **43 km**

Enrichment

1. Assign *Letter Logic* at the bottom of page 35. Students need to use regrouping concepts to solve the problems.

2. Have the students fill in the empty spaces to make a magic square.

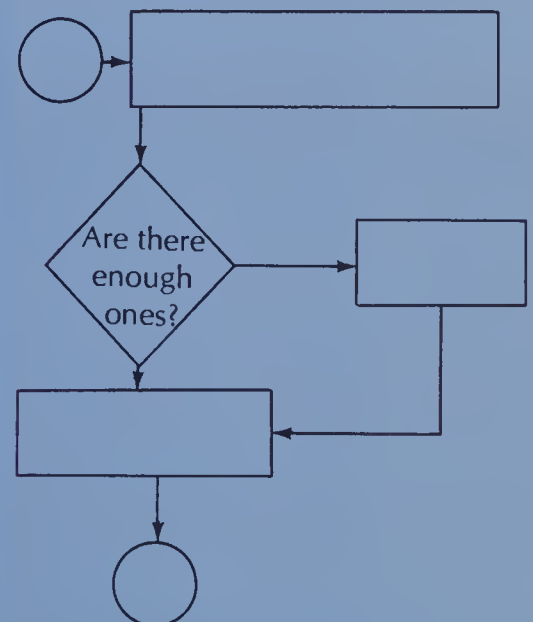
a.

12	7	8
5	9	13
10	11	6

b.

10	5	6
3	7	11
8	9	4

3. Ask the students to fill in the rest of this flow chart with the steps needed for two-place subtraction requiring regrouping.



Extra Practice

Find the difference. Check by adding.

1. $\begin{array}{r} 75 \\ -28 \\ \hline 47 \end{array}$
2. $\begin{array}{r} 23 \\ -14 \\ \hline 9 \end{array}$
3. $\begin{array}{r} 51 \\ -45 \\ \hline 6 \end{array}$
4. $\begin{array}{r} 87 \\ -59 \\ \hline 28 \end{array}$
5. $\begin{array}{r} 62 \\ -13 \\ \hline 49 \end{array}$
6. $\begin{array}{r} 91 \\ -76 \\ \hline 15 \end{array}$
7. $\begin{array}{r} 73 \\ -46 \\ \hline 27 \end{array}$
8. $\begin{array}{r} 84 \\ -38 \\ \hline 46 \end{array}$

Round to the nearest ten. Write the estimated difference.

9. $32 - 17 = \underline{\quad}$ **$30 - 20 = 10$**
10. $48 - 19 = \underline{\quad}$ **$50 - 20 = 30$**
11. $72 - 28 = \underline{\quad}$ **$70 - 30 = 40$**

Solve.

12. Ninety-three players started the soccer season. Forty-five were 12 years old. Eighty-six players finished. How many players dropped out? **7 players**

Worksheet A5

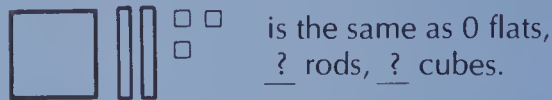
Pages 34-35

Objective A6

Subtract three-digit numbers, with regrouping.

Introducing the Lesson

Use number blocks to illustrate the following regrouping activity.



Trade 1 rod for 10 cubes.



Trade 1 flat for 10 rods.



100s	10s	1s	→	100s	10s	1s
1	2	3		0	11	13

Teaching the Lesson

Read and discuss the problem at the top of page 36. Illustrate the subtraction steps with number blocks before recording the algorithm on the chalkboard.

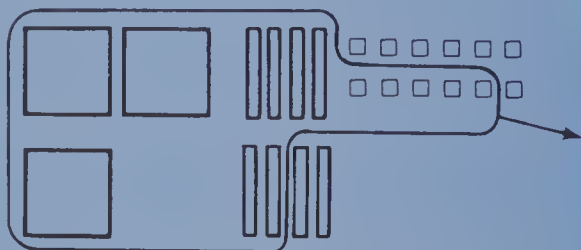
Take 3 flats, 6 rods, and 5 cubes from the following set.



Since there are not enough cubes, trade 1 rod for 10 cubes.



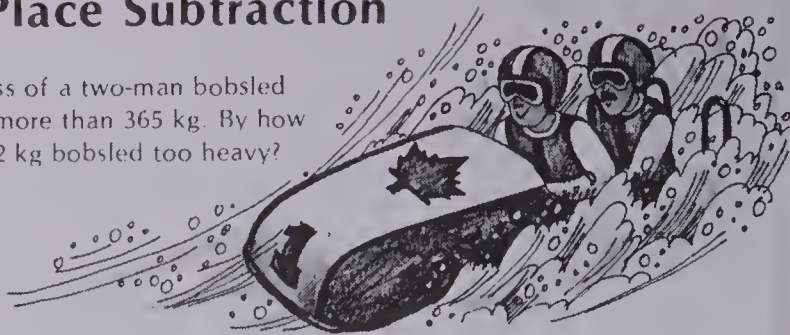
Take away 3 flats, 6 rods and 5 cubes.



2 rods and 7 cubes are left.

Three-Place Subtraction

The total mass of a two-man bobsled must not be more than 365 kg. By how much is a 392 kg bobsled too heavy?



Regroup tens and ones.

Subtract ones.

Subtract tens.

Subtract hundreds.

	Regroup tens and ones.	Subtract ones.	Subtract tens.	Subtract hundreds.
392 - 365	$\begin{array}{r} 8\ 12 \\ 3\cancel{9}\cancel{2} \\ - 3\ 6\ 5 \\ \hline \end{array}$	$\begin{array}{r} 8\ 12 \\ 3\cancel{9}\cancel{2} \\ - 3\ 6\ 5 \\ \hline 7 \end{array}$	$\begin{array}{r} 8\ 12 \\ 3\cancel{9}\cancel{2} \\ - 3\ 6\ 5 \\ \hline 2\ 7 \end{array}$	$\begin{array}{r} 8\ 12 \\ 3\cancel{9}\cancel{2} \\ - 3\ 6\ 5 \\ \hline 2\ 7 \end{array}$

The 392 kg bobsled is 27 kg too heavy.

Check: $365 + 27 = 392$

EXERCISES

Subtract.

- $$\begin{array}{r} 35 \\ - 19 \\ \hline 16 \end{array}$$
- $$\begin{array}{r} 435 \\ - 219 \\ \hline 216 \end{array}$$
- $$\begin{array}{r} 62 \\ - 29 \\ \hline 33 \end{array}$$
- $$\begin{array}{r} 762 \\ - 129 \\ \hline 633 \end{array}$$
- $$\begin{array}{r} 862 \\ - 529 \\ \hline 333 \end{array}$$
- $$51 - 33 = 18$$
- $$451 - 233 = 218$$
- $$70 - 39 = 31$$
- $$870 - 639 = 231$$
- $$\begin{array}{r} 437 \\ - 250 \\ \hline 187 \end{array}$$
- $$\begin{array}{r} 569 \\ - 184 \\ \hline 385 \end{array}$$
- $$\begin{array}{r} 345 \\ - 27 \\ \hline 318 \end{array}$$
- $$\begin{array}{r} 163 \\ - 54 \\ \hline 109 \end{array}$$
- $$\begin{array}{r} 323 \\ - 105 \\ \hline 218 \end{array}$$
- $$\begin{array}{r} 702 \\ - 273 \\ \hline 429 \end{array}$$
- $$\begin{array}{r} 625 \\ - 329 \\ \hline 296 \end{array}$$
- $$\begin{array}{r} 702 \\ - 273 \\ \hline 429 \end{array}$$
- $$\begin{array}{r} 501 \\ - 199 \\ \hline 302 \end{array}$$
- $$\begin{array}{r} 800 \\ - 198 \\ \hline 602 \end{array}$$

Subtract. Check by adding.

- $$461 - 88 = 373$$
- $$711 - 352 = 359$$
- $$400 - 267 = 133$$
- $$900 - 638 = 262$$

Using the Exercises

- In questions 1 to 9, questions are paired or grouped by basic facts. allow the students to concentrate on the regrouping procedure.
- Questions 6 to 9 and 20 to 23 provide practice in rewriting subtraction problems vertically.
- Questions 10 to 19 provide mixed practice including regrouping once or twice, regrouping with zeros, and subtracting with numbers that do not have the same number of digits.
- Questions 20 to 23 require the checking of answers.

PRACTICE

Find the difference.

1. $732 - 124 = 608$
2. $747 - 385 = 362$
3. $668 - 392 = 276$
4. $582 - 264 = 318$
5. $721 - 209 = 512$
6. $631 - 287 = 344$
7. $760 - 258 = 502$
8. $821 - 388 = 433$
9. $552 - 238 = 314$
10. $531 - 299 = 232$
11. $612 - 207 = 405$
12. $700 - 383 = 317$
13. $925 - 498 = 427$
14. $500 - 452 = 48$
15. $742 - 355 = 387$
16. $800 - 689 = 111$
17. $932 - 785 = 147$
18. $408 - 68 = 340$
19. $600 - 79 = 521$

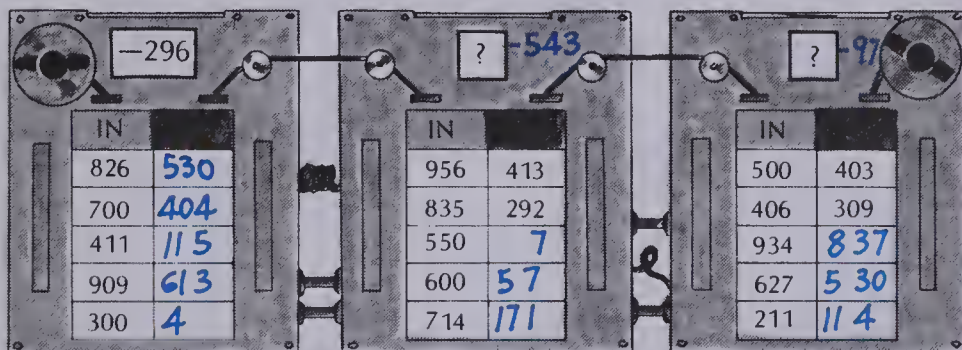
Subtract. Check by adding.

20. $623 - 259 = 364$
21. $509 - 243 = 266$
22. $600 - 154 = 446$
23. $764 - 388 = 376$

Solve.

24. Seven hundred thirty-four people watched the bobsled race. Two hundred ninety-six were youths. How many were adults? 438
25. Two bobsled helmets regularly cost \$130. On sale they cost \$39 less. How much do the helmets cost on sale? $\$91$

Computer Tutor



37

Assigning the Practice

Minimum: 1-14, 19-20, 23-25

Average 6-25

Enriched: 10-25

Reinforcement

1. Assign *Computer Tutor* at the bottom of page 37. Encourage the students to think of other functions for the rest of the class to solve.
2. Have the students fill in the missing numbers in these cross-number puzzles.

Subtract across.

421	184	237
347	159	188
74	25	49

Subtract down.

573	294	279
178	47	131
395	247	148

706	529	177
448	243	205
258	286	28

500	426	74
307	186	121
193	240	47

Enrichment

1. Ask some students to research the sport of bobsledding and report on it to the class. Students can investigate the kinds of sleds, the clothing needed, the rules, and the Olympic and world records held by bobsled teams.
2. Have the students try the following
 - a. Take a three-digit number in which the ones digit is less than the hundreds digit.
 - b. Reverse the digits.
 - c. Subtract.
 - d. Reverse the digits in the answer.
 - e. Add.

$$\begin{array}{r}
 624 \\
 - 426 \\
 \hline
 198 \\
 + 891 \\
 \hline
 1089
 \end{array}$$

Then ask the students to do the same with 713, 825, and numbers of their own choosing. What do they notice? Does it always work?

Extra Practice

Find the difference. Check by adding.

1. $937 - 429 = 508$
2. $837 - 618 = 219$
3. $737 - 458 = 279$
4. $307 - 255 = 52$
5. $602 - 546 = 56$
6. $913 - 264 = 649$
7. $400 - 321 = 79$
8. $300 - 78 = 222$

Round to the nearest hundred. Write the estimated difference.

9. $731 - 364 = 367$ $700 - 400 = 300$
10. $805 - 298 = 507$ $800 - 300 = 500$
11. $621 - 425 = 196$ $600 - 400 = 200$

Solve.

12. This year 810 students attended the track meet. Last year 691 attended and the year before 572 attended. How many more people attended this year than last year? 119 How many more attended this year than two years ago? 238

Worksheet A6

Pages 36-37

Objective A7

Subtract four-digit numbers, with regrouping.

Introducing the Lesson

Discuss the decathlon event in track and field. Point out that the prefix "dec" means ten and explain that a decathlon is an athletic contest consisting of ten events. In the Olympic Games the events are the 100 metre, 400 metre, and 1500 metre track events, the 110 metre high hurdles, the javelin, discus, shot put, pole vault, high jump, and broad jump. Point out the last five decathlon Olympic gold medalists named at the top of page 38.

Teaching the Lesson

Read and discuss the problem at the top of page 38. Discuss the required subtraction with a place-value chart. (Number blocks can be used, if a more concrete example is needed.)

1000s	100s	10s	1s
7	14	8	15
8	4	8	5
- 7	8	8	7
	6	0	8

Stress the regrouping steps.

1. Since there are not enough ones, trade 1 ten for 10 ones, making 15 ones.
2. Since there are not enough hundreds, trade 1 thousand for 10 hundreds, making 14 hundreds.

Encourage the use of estimation in subtracting larger numbers. Have the students try several examples where rounding to the nearest thousand is required.

$$\begin{array}{r} 8125 \longrightarrow \text{rounds to } 8000 \\ - 6873 \longrightarrow \text{rounds to } 7000 \\ \hline 1000 \end{array}$$

Subtracting Larger Numbers

How many more points did the 1980 winner have than the 1964 winner?

Decathlon Olympic Gold Medalists		
1964	Willi Holdorf (Germany)	7887 points
1968	Bill Toomey (U.S.A.)	8193 points
1972	Nikolai Avilov (U.S.S.R.)	8454 points
1976	Bruce Jenner (U.S.A.)	8618 points
1980	Daley Thompson (Great Britain)	8495 points

Regroup? **Yes**
Subtract ones.

$$\begin{array}{r} 815 \\ 8498 \\ - 7887 \\ \hline 8 \end{array}$$

Regroup? **No**
Subtract tens.

$$\begin{array}{r} 815 \\ 8498 \\ - 7887 \\ \hline 08 \end{array}$$

Regroup? **Yes**
Subtract hundreds.

$$\begin{array}{r} 714815 \\ 8498 \\ - 7887 \\ \hline 608 \end{array}$$

Subtract thousands.

$$\begin{array}{r} 714815 \\ 8498 \\ - 7887 \\ \hline 608 \end{array}$$

The 1980 winner had 608 more points

EXERCISES

Subtract.

$$\begin{array}{r} 1. \quad 3728 \\ - 1493 \\ \hline 2235 \end{array}$$

$$\begin{array}{r} 2. \quad 7562 \\ - 4271 \\ \hline 3291 \end{array}$$

$$\begin{array}{r} 3. \quad 6439 \\ - 5268 \\ \hline 1171 \end{array}$$

$$\begin{array}{r} 4. \quad 8471 \\ - 2225 \\ \hline 6246 \end{array}$$

$$\begin{array}{r} 5. \quad 4762 \\ - 1891 \\ \hline 2871 \end{array}$$

$$\begin{array}{r} 6. \quad 5982 \\ - 2195 \\ \hline 3787 \end{array}$$

$$\begin{array}{r} 7. \quad 8634 \\ - 6892 \\ \hline 1742 \end{array}$$

$$\begin{array}{r} 8. \quad 6483 \\ - 4525 \\ \hline 1958 \end{array}$$

$$\begin{array}{r} 9. \quad 7531 \\ - 876 \\ \hline 6655 \end{array}$$

$$\begin{array}{r} 10. \quad 4250 \\ - 2481 \\ \hline 1769 \end{array}$$

$$\begin{array}{r} 11. \quad 6705 \\ - 967 \\ \hline 5738 \end{array}$$

$$\begin{array}{r} 12. \quad 9132 \\ - 798 \\ \hline 8334 \end{array}$$

Subtract. Check by adding.

$$\begin{array}{r} 13. \quad 9001 \\ - 7862 \\ \hline 1139 \end{array}$$

$$\begin{array}{r} 14. \quad 7000 \\ - 427 \\ \hline 6573 \end{array}$$

$$\begin{array}{r} 15. \quad 5009 \\ - 2139 \\ \hline 2870 \end{array}$$

$$\begin{array}{r} 16. \quad 6050 \\ - 2974 \\ \hline 3076 \end{array}$$

38

Using the Exercises

- Questions 1 to 12 gradually develop the subtraction of larger numbers by starting with problems requiring only one regrouping and ending with problems requiring three regroupings.
- Questions 13 to 16 have zeros in the minuend, which often causes trouble for students. These problems are to be checked.

PRACTICE

Find the difference.

- | | | | | |
|---|---|---|---|--|
| 1. $\begin{array}{r} 5402 \\ - 2347 \\ \hline 3055 \end{array}$ | 2. $\begin{array}{r} 8000 \\ - 5389 \\ \hline 2611 \end{array}$ | 3. $\begin{array}{r} 7016 \\ - 6244 \\ \hline 772 \end{array}$ | 4. $\begin{array}{r} 7620 \\ - 2417 \\ \hline 5203 \end{array}$ | 5. $\begin{array}{r} 7724 \\ - 3583 \\ \hline 4141 \end{array}$ |
| 6. $\begin{array}{r} 7804 \\ - 2346 \\ \hline 5458 \end{array}$ | 7. $\begin{array}{r} 5327 \\ - 2456 \\ \hline 2871 \end{array}$ | 8. $\begin{array}{r} 6003 \\ - 3539 \\ \hline 2464 \end{array}$ | 9. $\begin{array}{r} 4000 \\ - 2717 \\ \hline 1283 \end{array}$ | 10. $\begin{array}{r} 9530 \\ - 3763 \\ \hline 5767 \end{array}$ |

Subtract. Check by adding.

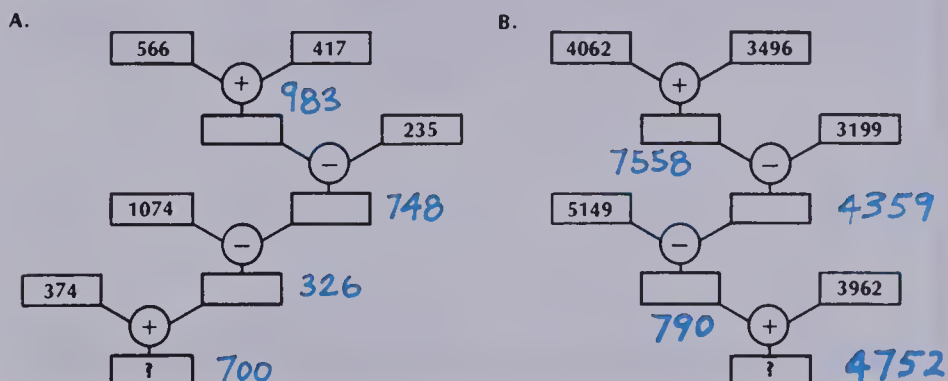
- | | | | | |
|---|---|--|--|--|
| 11. $\begin{array}{r} 4235 \\ - 740 \\ \hline 3495 \end{array}$ | 12. $\begin{array}{r} 2459 \\ - 570 \\ \hline 1889 \end{array}$ | 13. $\begin{array}{r} 1000 \\ - 768 \\ \hline 232 \end{array}$ | 14. $\begin{array}{r} 4002 \\ - 2354 \\ \hline 1648 \end{array}$ | 15. $\begin{array}{r} 3000 \\ - 1347 \\ \hline 1653 \end{array}$ |
|---|---|--|--|--|

Solve. Use the chart on page 38.

16. How many more points did Bruce Jenner have than Bill Toomey? **425**
17. How many more points did Nikolai Avilov have than Willi Holdorf? **567**
18. Who had fewer points, Bill Toomey or Willi Holdorf? How many fewer? **Holdorf, 306**

Math Hopscotch

Find the last number.



39

Assigning the Practice

Minimum: odd numbers

Average: even numbers

Enriched: 11-18

Reinforcement

1. Assign *Math Hopscotch* at the bottom of page 39. Each exercise provides a review of addition and subtraction. Students may wish to check their work with a calculator.

2. List the following important events in Canadian history. Ask the students to compute how long ago each one was.

- 1759 Battle of the Plains of Abraham
- 1848 government formed in Nova Scotia
- 1867 Confederation
- 1885 last spike of CPR
- 1914 World War I
- 1939 World War II

Enrichment

1. Ask the students to do some research on the decathlon in the Olympic Games. Have them write a report on their findings and then share the information with the rest of the class.

2. Have the students make a bar graph of the points the last five Olympic gold medalists made in the decathlon event (use the information given on page 38).

Extra Practice

Subtract. Check by adding.

- | | | | |
|---|---|---|---|
| 1. $\begin{array}{r} 2176 \\ - 1028 \\ \hline 1148 \end{array}$ | 2. $\begin{array}{r} 3875 \\ - 1298 \\ \hline 2577 \end{array}$ | 3. $\begin{array}{r} 7463 \\ - 1267 \\ \hline 6196 \end{array}$ | 4. $\begin{array}{r} 8465 \\ - 6791 \\ \hline 1674 \end{array}$ |
| 5. $\begin{array}{r} 5109 \\ - 3077 \\ \hline 2032 \end{array}$ | 6. $\begin{array}{r} 4020 \\ - 2756 \\ \hline 1264 \end{array}$ | 7. $\begin{array}{r} 7532 \\ - 6746 \\ \hline 786 \end{array}$ | 8. $\begin{array}{r} 7000 \\ - 2134 \\ \hline 4866 \end{array}$ |

Round to the nearest thousand. Write the estimated difference.

9. $5277 - 4308 = \underline{\quad}$ 10. $6895 - 2916 = \underline{\quad}$ 11. $3908 - 1146 = \underline{\quad}$
- 5000 - 4000 = 1000 7000 - 3000 = 4000 4000 - 1000 = 3000**

Solve.

12. Mr. Brownley put 2460 m of fencing around one field and 1625 m of fencing around another field. Mr. Ferrara put 3998 m of fencing around his field. How many more metres of fencing did Mr. Brownley use than Mr. Ferrara? **87 m**

Worksheet A7

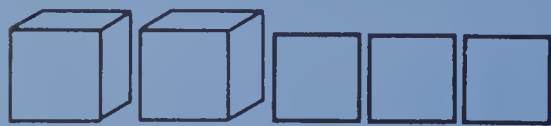
Pages 38-39

Objective A8

Add and subtract decimals in tenths.

Introducing the Lesson

Show the following number-block model and ask the students to determine the number represented, if the block is one whole.



2 blocks and 3 flats
Since 10 flats make a block,
a flat is $\frac{1}{10}$ of a block.
So, there are 2.3 blocks.

1s	$\frac{1}{10}$ s
2	3

There are 2 ones and 3 tenths.

Have the students illustrate several other decimals in tenths with number blocks and then record them in standard form.

Teaching the Lesson

Refer the class to the problems at the top of page 40. Illustrate the addition and subtraction required with number blocks. Stress the regrouping steps.

Regroup the 11 tenths as 1 one and 1 tenth.

1s	$\frac{1}{10}$ s
1	
3	4
+ 1	7
5	1

Regroup 1 one as 10 tenths and subtract.

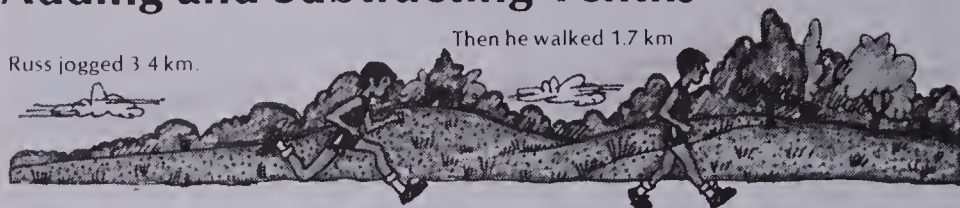
1s	$\frac{1}{10}$ s
2	14
1	4
- 1	7
1	7

Have the students practise several other similar examples with number blocks and then record the algorithm for each at the chalkboard.

Adding and Subtracting Tenths

Russ jogged 3.4 km.

Then he walked 1.7 km



How many kilometres did Russ travel altogether?

Keep the decimal points in a line.

$$\begin{array}{r} 1 \\ 3.4 \\ + 1.7 \\ \hline 5.1 \end{array}$$

He travelled 5.1 km altogether.

How much farther did he jog than walk?

Keep the decimal points in a line.

$$\begin{array}{r} 2 \quad 14 \\ \cancel{3.4} \\ - 1.7 \\ \hline 1.7 \end{array}$$

He jogged 1.7 km farther.

EXERCISES

Add.

- | | | | | |
|--|--|--|--|---|
| 1. $\begin{array}{r} 0.2 \\ + 0.4 \\ \hline 0.6 \end{array}$ | 2. $\begin{array}{r} 0.7 \\ + 0.2 \\ \hline 0.9 \end{array}$ | 3. $\begin{array}{r} 0.4 \\ + 0.9 \\ \hline 1.3 \end{array}$ | 4. $\begin{array}{r} 1.5 \\ + 6.6 \\ \hline 8.1 \end{array}$ | 5. $\begin{array}{r} 17.8 \\ + 21.5 \\ \hline 39.3 \end{array}$ |
| 6. $\begin{array}{r} 1.8 \\ + 2.4 \\ \hline 4.2 \end{array}$ | 7. $\begin{array}{r} 19.2 \\ + 8.9 \\ \hline 28.1 \end{array}$ | 8. $\begin{array}{r} 27.4 \\ + 4.7 \\ \hline 32.1 \end{array}$ | 9. $\begin{array}{r} 21.3 \\ + 6.8 \\ \hline 28.1 \end{array}$ | 10. $\begin{array}{r} 15.9 \\ + 4.8 \\ \hline 20.7 \end{array}$ |
| 11. $0.7 + 1.4 + 0.6$ | 12. $9.5 + 6.7 + 0.8$ | 13. $42.6 + 81.4 + 62.3$ | | |

Subtract.

- | | | | | |
|---|---|--|---|---|
| 14. $\begin{array}{r} 9.6 \\ - 5.5 \\ \hline 4.1 \end{array}$ | 15. $\begin{array}{r} 6.5 \\ - 3.2 \\ \hline 3.3 \end{array}$ | 16. $\begin{array}{r} 7.3 \\ - 2.4 \\ \hline 4.9 \end{array}$ | 17. $\begin{array}{r} 5.7 \\ - 2.4 \\ \hline 3.3 \end{array}$ | 18. $\begin{array}{r} 4.2 \\ - 2.6 \\ \hline 1.6 \end{array}$ |
| 19. $\begin{array}{r} 7.0 \\ - 4.8 \\ \hline 2.2 \end{array}$ | 20. $\begin{array}{r} 2.0 \\ - 1.2 \\ \hline 0.8 \end{array}$ | 21. $\begin{array}{r} 10.0 \\ - 0.8 \\ \hline 9.2 \end{array}$ | 22. $\begin{array}{r} 50.0 \\ - 3.5 \\ \hline 46.5 \end{array}$ | 23. $\begin{array}{r} 30.0 \\ - 1.4 \\ \hline 28.6 \end{array}$ |

Using the Exercises

- Questions 1 to 13 involve the addition of tenths. The examples are arranged in order of difficulty. See that the students align the decimal points and digits properly, especially in problems that leave decimals with unequal numbers of digits.
- Questions 14 to 23 involve the subtraction of tenths. Check that the students do the regrouping steps properly, especially in the last five problems which have zeros in the minuend.

PRACTICE

Add.

$$\begin{array}{r} 1. \quad 0.7 \\ + 0.6 \\ \hline 1.3 \end{array}$$

$$\begin{array}{r} 2. \quad 4.8 \\ + 2.6 \\ \hline 7.4 \end{array}$$

$$\begin{array}{r} 3. \quad 8.4 \\ + 2.7 \\ \hline 11.1 \end{array}$$

$$\begin{array}{r} 4. \quad 17.9 \\ + 8.9 \\ \hline 26.8 \end{array}$$

$$\begin{array}{r} 5. \quad 16.9 \\ + 3.7 \\ \hline 20.6 \end{array}$$

$$\begin{array}{r} 6. \quad 0.4 \\ 0.6 \\ + 0.9 \\ \hline 1.9 \end{array}$$

$$\begin{array}{r} 7. \quad 46.4 \\ 5.3 \\ + 12.3 \\ \hline 64.0 \end{array}$$

$$\begin{array}{r} 8. \quad 19.2 \\ 6.0 \\ + 0.8 \\ \hline 26.0 \end{array}$$

$$\begin{array}{r} 9. \quad 50.2 \\ 0.8 \\ + 3.9 \\ \hline 54.9 \end{array}$$

$$\begin{array}{r} 10. \quad 41.1 \\ 0.9 \\ + 86.8 \\ \hline 128.8 \end{array}$$

$$11. \quad 0.8 + 0.9 + 2.5 = 4.2$$

$$12. \quad 42.6 + 1.7 + 2.4 = 46.7$$

$$13. \quad 52.1 + 6.2 + 0.7 = 59.0$$

Subtract.

$$\begin{array}{r} 14. \quad 4.3 \\ - 3.7 \\ \hline 0.6 \end{array}$$

$$\begin{array}{r} 15. \quad 15.7 \\ - 4.9 \\ \hline 10.8 \end{array}$$

$$\begin{array}{r} 16. \quad 32.3 \\ - 14.6 \\ \hline 17.7 \end{array}$$

$$\begin{array}{r} 17. \quad 100.4 \\ - 78.9 \\ \hline 21.5 \end{array}$$

$$\begin{array}{r} 18. \quad 99.8 \\ - 9.9 \\ \hline 89.9 \end{array}$$

$$\begin{array}{r} 19. \quad 10.1 \\ - 9.2 \\ \hline 0.9 \end{array}$$

$$\begin{array}{r} 20. \quad 200.3 \\ - 14.7 \\ \hline 185.6 \end{array}$$

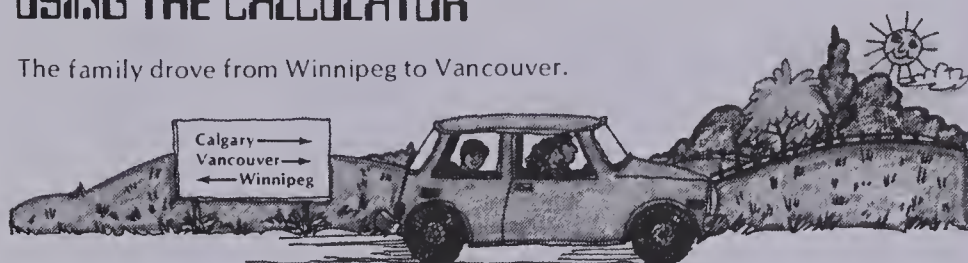
$$\begin{array}{r} 21. \quad 50.1 \\ - 9.4 \\ \hline 40.7 \end{array}$$

$$\begin{array}{r} 22. \quad 11.1 \\ - 10.4 \\ \hline 0.7 \end{array}$$

$$\begin{array}{r} 23. \quad 600.3 \\ - 74.6 \\ \hline 525.7 \end{array}$$

USING THE CALCULATOR

The family drove from Winnipeg to Vancouver.



Day	kilometres travelled	litres of gas used
Monday	445	37.2
Tuesday	505	42.0
Wednesday	474	39.6
Thursday	433	36.0
Friday	375	31.2
total	2232	186.0

Use your calculator to find the answers.

1. How many kilometres did they travel altogether? **2232 km**

2. How many litres of gas were used in all? **186.0 L**

3. How many kilometres did they average each day? **446.4 km**

41

Assigning the Practice

Minimum: 1-8, 14-21

Average: 1-23

Enriched: 1-23

Reinforcement

1. Prepare a set of strings cut to these lengths: 1.7 m, 1.9 m, 0.5 m, 2.2 m, 2.6 m, and 3.1 m. Label the strings from A to F. Ask the students to measure lengths with a metre stick and answer these questions:

- If strings B, D, and F were laid end to end, how long would they be altogether?
- Which is longer, string C or D? By how much?
- Which string length is the sum of two other string lengths?
- What would be the length of all of the strings, if they were laid end to end?
- Which string is the longest? By how much is it longer than the next longest string?

2. Ask the students to find the one that does not belong in each group.

a. $26.5 + 19.8 = 46.3$ $76.8 - 30.5 = 46.3$
 $20.6 + 25.7 = 46.3$ $12.3 + 32.9 = 45.2$

b. $61.4 + 21.1 = 82.5$ $99.2 - 16.7 = 82.5$
 $91.7 - 9.3 = 82.4$ $36.8 + 45.7 = 82.5$

c. $75.9 - 23.1 = 52.8$ $31.9 + 21.1 = 53$
 $45.2 + 7.6 = 52.8$ $95.3 - 42.5 = 52.8$

Enrichment

1. Assign *Using the Calculator* at the bottom of page 41.

2. Have the students find the following sums on a calculator. The calculator should then be turned upside down so that the answer to the riddle can be found.

a. $265.924.6 + 106.290.4 = 372.215$

What does bacon do on a hot pan? **sizzle**

b. $562.95 + 1091.12 + 4151.27 = 5805.34$

What does Tyler do when he is assigned 999 subtraction problems? **he sobs**

Extra Practice

Worksheet A8

Pages 40-41

Find the sum.

$$\begin{array}{r} 1. \quad 1.7 \\ + 2.3 \\ \hline 4.0 \end{array}$$

$$\begin{array}{r} 2. \quad 8.5 \\ + 4.6 \\ \hline 13.1 \end{array}$$

$$\begin{array}{r} 3. \quad 5.5 \\ 4.6 \\ + 3.8 \\ \hline 13.9 \end{array}$$

$$\begin{array}{r} 4. \quad 16.8 \\ 14.7 \\ + 13.9 \\ \hline 45.4 \end{array}$$

$$\begin{array}{r} 5. \quad 9.5 \\ 16.4 \\ + 8.6 \\ \hline 34.5 \end{array}$$

Find the difference.

$$\begin{array}{r} 6. \quad 4.8 \\ - 1.9 \\ \hline 2.9 \end{array}$$

$$\begin{array}{r} 7. \quad 6.0 \\ - 3.7 \\ \hline 2.3 \end{array}$$

$$\begin{array}{r} 8. \quad 15.2 \\ - 8.7 \\ \hline 6.5 \end{array}$$

$$\begin{array}{r} 9. \quad 16.2 \\ - 7.3 \\ \hline 8.9 \end{array}$$

$$\begin{array}{r} 10. \quad 312.5 \\ - 67.6 \\ \hline 244.9 \end{array}$$

Solve.

11. Anna jumped 1.7 m in the long jump. Mary jumped 2.2 m. How much farther did Mary jump than Anna? **0.5 m**

12. A hockey player has a mass of 34.7 kg. His hockey equipment has a mass of 4.4 kg. What is his mass when he is fully dressed? **39.1 kg**

UNIT 2 LESSON 9

Objective A9

Add and subtract decimals in hundredths.

Introducing the Lesson

Relate place value in our base ten number system to money. Show:

a.

□ □ □

metre stick

□ □

3 cubes = 3 cm or 0.03 m

2 rods = 20 cm or 0.2 m

b.



= \$0.03 or 0.03 of a dollar



= \$0.20 or 0.2 of a dollar

c.

10s	1s	$\frac{1}{10}$ s	$\frac{1}{100}$ s
	0	0	3
	0	2	

dollars	dimes	pennies
\$ 0	0	3
\$ 0	2	0

Teaching the Lesson

Read and discuss the top of page 42. Write the subtraction on the chalkboard and explain the regrouping steps involved. Note that the problem has three zeros in the minuend, making the regrouping steps very complex. Point out that the writing of the regrouping steps has been abbreviated.

Longer way:

Shorter Way:

$$\begin{array}{r} 99 \\ 41010 \\ \cancel{41010} \\ \$\cancel{50.00} \\ - 35.99 \\ \hline \$14.01 \end{array}$$

$$\begin{array}{r} 49\ 910 \\ \$\cancel{50.00} \\ - 35.99 \\ \hline \$14.01 \end{array}$$

Ask the students to solve these questions using the prices of the tennis items at the top of page 42.

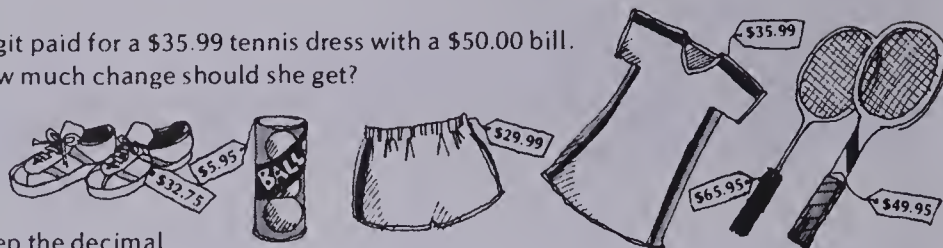
a. What is the cost of all of the tennis clothing? **\$98.73**

b. What is the change from \$40.00 for a pair of shoes? **\$7.25**

c. What is the total cost of the cheaper tennis racquet and a can of tennis balls? **\$55.90**

Adding and Subtracting Hundredths

Brigit paid for a \$35.99 tennis dress with a \$50.00 bill. How much change should she get?



Keep the decimal points in a line.

$$\begin{array}{r} \$50.00 \\ - 35.99 \\ \hline . \end{array}$$

Regroup.

$$\begin{array}{r} 49\ 910 \\ \$50.00 \\ - 35.99 \\ \hline . \end{array}$$

Subtract.

$$\begin{array}{r} 49\ 910 \\ \$50.00 \\ - 35.99 \\ \hline \$14.01 \end{array}$$

Check:

$$\begin{array}{r} \$35.99 \\ + 14.01 \\ \hline \$50.00 \end{array}$$

Brigit should get \$14.01 in change.

EXERCISES

Add.

$$\begin{array}{r} 1. \quad 0.06 \\ + 0.09 \\ \hline 0.15 \end{array}$$

$$\begin{array}{r} 2. \quad 0.08 \\ + 0.04 \\ \hline 0.12 \end{array}$$

$$\begin{array}{r} 3. \quad 0.16 \\ + 0.09 \\ \hline 0.25 \end{array}$$

$$\begin{array}{r} 4. \quad 0.25 \\ + 0.48 \\ \hline 0.73 \end{array}$$

$$\begin{array}{r} 5. \quad \$1.42 \\ + 0.79 \\ \hline \$2.21 \end{array}$$

$$\begin{array}{r} 6. \quad \$5.79 \\ + 0.86 \\ \hline \$6.65 \end{array}$$

$$\begin{array}{r} 7. \quad \$42.05 \\ + 3.56 \\ \hline \$45.61 \end{array}$$

$$\begin{array}{r} 8. \quad \$91.29 \\ + 9.89 \\ \hline \$101.18 \end{array}$$

Subtract.

$$\begin{array}{r} 9. \quad 0.47 \\ - 0.39 \\ \hline 0.08 \end{array}$$

$$\begin{array}{r} 10. \quad 0.18 \\ - 0.09 \\ \hline 0.09 \end{array}$$

$$\begin{array}{r} 11. \quad 6.41 \\ - 0.58 \\ \hline 5.83 \end{array}$$

$$\begin{array}{r} 12. \quad 9.75 \\ - 6.82 \\ \hline 2.93 \end{array}$$

Subtract. Check by adding.

$$\begin{array}{r} 13. \quad \$14.00 \\ - 5.25 \\ \hline \$8.75 \end{array}$$

$$\begin{array}{r} 14. \quad \$24.00 \\ - 7.99 \\ \hline \$16.01 \end{array}$$

$$\begin{array}{r} 15. \quad \$52.00 \\ - 25.89 \\ \hline \$26.11 \end{array}$$

$$\begin{array}{r} 16. \quad \$40.00 \\ - 21.75 \\ \hline \$18.25 \end{array}$$

Using the Exercises

- Questions 1 to 12 provide practice with adding and subtracting hundredths. Both money and non-money examples are used. Students should be sure to include dollar signs where appropriate.
- Questions 13 to 16 involve subtraction with more difficult regrouping. Results must be checked by adding.

PRACTICE

Add

1.
$$\begin{array}{r} 0.34 \\ + 0.25 \\ \hline 0.59 \end{array}$$
2.
$$\begin{array}{r} 0.78 \\ + 0.65 \\ \hline 1.43 \end{array}$$
3.
$$\begin{array}{r} 8.43 \\ + 0.27 \\ \hline 8.70 \end{array}$$
4.
$$\begin{array}{r} 19.62 \\ + 5.88 \\ \hline 25.50 \end{array}$$
5.
$$\begin{array}{r} \$7.14 \\ 3.22 \\ + 5.61 \\ \hline \$15.97 \end{array}$$
6.
$$\begin{array}{r} \$6.71 \\ 4.82 \\ + 6.14 \\ \hline \$17.67 \end{array}$$
7.
$$\begin{array}{r} \$37.35 \\ 6.13 \\ + 35.35 \\ \hline \$78.83 \end{array}$$
8.
$$\begin{array}{r} \$54.47 \\ 5.68 \\ + 14.83 \\ \hline \$74.98 \end{array}$$

Subtract.

9.
$$\begin{array}{r} 0.48 \\ - 0.21 \\ \hline 0.27 \end{array}$$
10.
$$\begin{array}{r} 0.82 \\ - 0.46 \\ \hline 0.36 \end{array}$$
11.
$$\begin{array}{r} 0.17 \\ - 0.08 \\ \hline 0.09 \end{array}$$
12.
$$\begin{array}{r} 7.82 \\ - 1.64 \\ \hline 6.18 \end{array}$$

Subtract. Check by adding

13.
$$\begin{array}{r} \$9.30 \\ - 8.42 \\ \hline \$0.88 \end{array}$$
14.
$$\begin{array}{r} 30.31 \\ - 27.91 \\ \hline 2.40 \end{array}$$
15.
$$\begin{array}{r} \$4.00 \\ - 1.28 \\ \hline \$2.72 \end{array}$$
16.
$$\begin{array}{r} \$50.00 \\ - 12.37 \\ \hline \$37.63 \end{array}$$

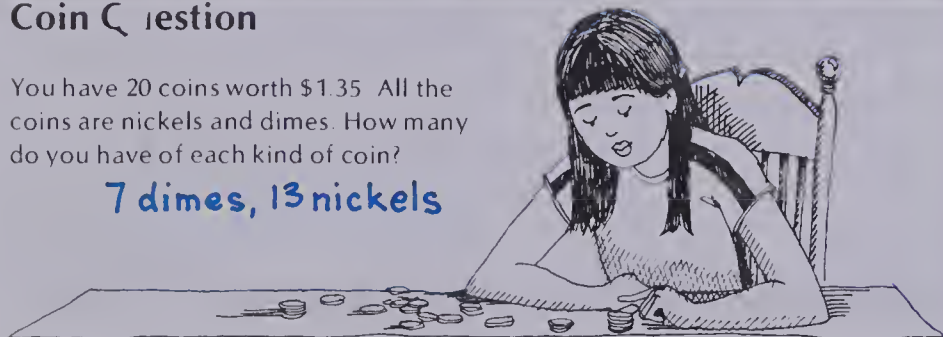
Solve. Use the prices given on page 42.

17. How much cheaper is one tennis racquet than the other? **\$16.00**
18. What is the total cost of a pair of tennis shoes, two cans of tennis balls, and a pair of tennis shorts? **\$74.64**
19. A can of tennis balls is paid for with a \$10.00 bill. How much change should be given? **\$4.05**

Coin Question

You have 20 coins worth \$1.35. All the coins are nickels and dimes. How many do you have of each kind of coin?

7 dimes, 13 nickels



43

Assigning the Practice

Minimum: 1-12

Average: 5-18

Enriched: 5-8, 13-19

Reinforcement

1. Have the students use a catalog to choose:

- a. four items of clothing,
- b. three toys,
- c. five household items.

Ask the students to cut out the pictures of the items, glue them to a piece of paper, and then total the cost of each set.

2. Have the students determine whether or not these are magic squares.

2.28	2.88	2.3
2.24	2.32	2.4
2.44	2.16	2.36

Not a magic square

1.85	9.2	3.95
7.1	5.0	2.9
6.05	0.8	8.15

magic square

Enrichment

1. Assign *Coin Question* at the bottom of page 43. Have the students draw a diagram of their solution.

2. Working in groups of three or four, have the students measure their heights and armspans in metres. Then ask each group to find the average height and arm-span for their group.

Extra Practice

Worksheet A9

Pages 42-43

Add or subtract.

1.
$$\begin{array}{r} 1.34 \\ + 3.45 \\ \hline 4.79 \end{array}$$
2.
$$\begin{array}{r} 5.73 \\ - 4.56 \\ \hline 1.17 \end{array}$$
3.
$$\begin{array}{r} 7.78 \\ + 4.56 \\ \hline 12.34 \end{array}$$
4.
$$\begin{array}{r} 40.67 \\ - 24.56 \\ \hline 16.11 \end{array}$$
5.
$$\begin{array}{r} 21.86 \\ + 9.47 \\ \hline 31.33 \end{array}$$
6.
$$\begin{array}{r} 10.00 \\ - 7.64 \\ \hline 2.36 \end{array}$$
7.
$$\begin{array}{r} 20.00 \\ - 11.28 \\ \hline 8.72 \end{array}$$
8.
$$\begin{array}{r} 51.94 \\ + 9.76 \\ \hline 61.70 \end{array}$$

Solve.

9. Laura is buying a baseball glove that costs \$17.68. How much change will she get from \$20.00? **\$2.32**
10. Scott is buying gym shorts for \$7.65 and socks for \$4.75. How much change will he get from \$15.00? **\$2.60**

Objective PS2

Solve word problems involving addition and subtraction

Introducing the Lesson

Give every two students a newspaper ad and two cards. Ask them to make up one addition or subtraction problem from the information in the ad and write it on the front of the card. Have each student write the following questions on the back of his or her card.

What do I know? _____

What do I want to know? _____

How do I get the answer? _____

Have the students who worked on the same ad exchange cards and answer the questions on the back.

Teaching the Lesson

Ask a student to read his or her problem. As the problem is read, fill in the following steps on the chalkboard.

Identify the facts _____

Decide what to do _____

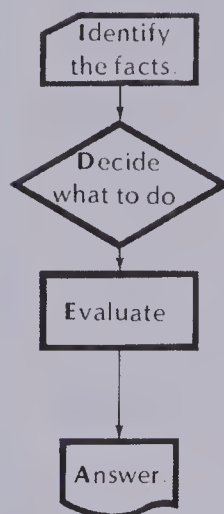
Evaluate _____

Answer _____

Ask the students to write the four steps on a piece of paper and to fill in the information as another student reads his or her problem.

Problem Solving

How much more is an adult ticket than a student ticket?



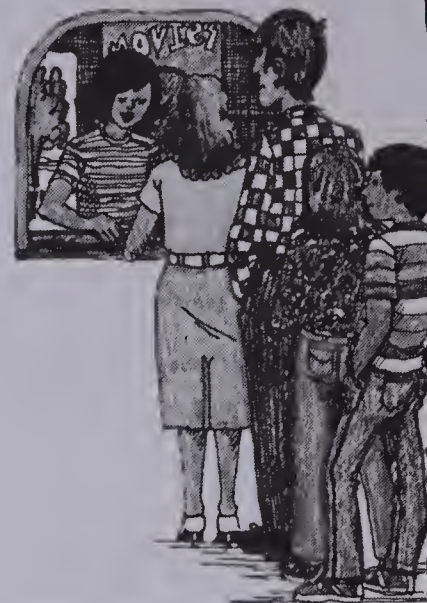
\$4.75 adult
\$3.50 student

Subtract to find how much more.

$$\begin{array}{r} \$4.75 \\ - \$3.50 \\ \hline \$1.25 \end{array}$$

An adult ticket is \$1.25 more than a student ticket.

Tickets	
Adult	\$4.75
Student (14-17 yrs.)	\$3.50
Child (under 14 yrs.)	\$2.25



EXERCISES

If this question were asked, would you add or subtract to get the answer?

- | | |
|--|-------------------------------------|
| 1. How many altogether? add | 2. How many less? subtract |
| 3. What is the difference? subtract | 4. How many more? subtract |
| 5. What is the total? add | 6. How much longer? subtract |
| 7. How many in all? add | 8. How much change? subtract |

Write the **Identify** and **Decide** steps.

- How much do the tickets for two adults and a teenager, age 15, cost?
- Wade is 11 years old. How much change would he get from \$5.00 for his ticket?

adult \$4.75
teenager \$3.50
add
child \$2.25
Bill \$5.00
subtract

Using the Exercises

- Questions 1 to 8 review key phrases that help students decide which operation to use. They can be done orally.
- Questions 9 to 10 ask students to determine the first two steps in solving each problem.

PRACTICE

Solve. Use the four **IDEA** steps.

- Reed is 14 years old. Mandy is 10 years old. How much more does a ticket for Reed cost than one for Mandy? **\$1.25**
- How much would tickets for two adults cost? **\$9.50**
- What is the total cost of tickets for two 15-year-olds and one 8-year-old? **\$9.25**
- How much less is a child's ticket than a student's ticket? **\$1.25**
- Tickets for a matinee are \$1.50 for a child and \$2.00 for a senior citizen. Rachel and Danny went with their grandmother. How much did the tickets cost? **\$5.00**



REVIEW

A5	Subtract.			
	1. $46 - 28$ 18	2. $34 - 16$ 18	3. $90 - 29$ 61	4. $64 - 49$ 15
A6	5. $321 - 119$ 202	6. $572 - 408$ 164	7. $206 - 48$ 158	8. $570 - 187$ 383
A7	9. $2175 - 1632$ 543	10. $5752 - 2891$ 2861	11. $4090 - 2134$ 1956	12. $6751 - 4752$ 1999
A8	Add or subtract.			
	13. $5.1 + 2.8$ 7.9	14. $4.6 + 0.7$ 5.3	15. $15.2 - 3.9$ 11.3	16. $28.4 - 9.6$ 18.8
A9	17. $\$4.62 + 2.76$ \$7.38	18. $\$75.63 + 9.47$ \$85.10	19. $\$59.50 - 26.55$ \$32.95	20. $\$36.00 - 17.95$ \$18.05

45

Assigning the Practice

Minimum: 1-4

Average: 1-5

Enriched: 1-5

Review Exercises

Questions	Objective	Pages
1-4	A5	34-35
5-8	A6	36-37
9-12	A7	38-39
13-16	A8	40-41
17-20	A9	42-43

Reinforcement

1. Obtain menus from local restaurants. Ask the students to order breakfast, lunch, and dinner from the menu. Have them total the cost of all three meals and find the change from \$50.00.

2. Have a bake sale within your own classroom. Assign prices for the items sold. Ask the students to write down all additions and subtractions that occur during the buying and selling time.

1 1	1 9 10
\$0.15 cookies	\$2.00
0.49 cupcakes	- 1.25 for a cake
+ 0.55 brownies	\$0.75 change
\$1.19 total cost	

Enrichment

1. Cut out articles or ads from the newspaper. Have each student glue an article to a card and compose a word problem for it. The cards can be exchanged among the students for solving, or collected in a box to be used at another time.

2. Direct the students to replace ■ with the missing number.

a. $17 + \blacksquare = 59$	b. $349 + 432 = 781$	c. $63.4 - 31.8 = 31.8$	d. $77.7 - 34.2 = 43.5$
-----------------------------	----------------------	-------------------------	-------------------------

Extra Practice

Worksheet PS2

Pages 44-45

Solve.

- Mandy lives 2.8 km from school and Reed lives 4.2 km from school. How much farther than Mandy does Reed live? **1.4 km**
- Jerry bought a shirt for \$16.95 and a tie for \$8.95. How much change did he get from \$30.00? **\$4.10**
- Alice wanted to make a jacket. She bought 2.2 m of corduroy and 1.7 m of lining fabric. How much fabric did she buy in all? **3.9 m**
- Mrs. Weimer's grocery bill included \$3.59 for Swiss cheese, \$4.62 for Cheddar cheese, \$2.89 for Bric cheese, \$2.29 for watermelon, \$1.99 for bananas, \$3.76 for peaches, and \$2.21 for cherries. Did she pay more for the cheese or for the fruit? How much more? **cheese, \$0.85**

Problem Solving Activities

Assign Level 5, Unit 2.

Unit 2 Objective	Test Questions	Pages
A1	1,2	26-27
A2	3,4	28-29
A3	5-10	30-31
A4	11-14,	32-33
A5	15,16	34-35
A6	17-19, 23-25	36-37
A7	20-22	38-39
A8	26,28	40-41
A9	27,29	42-43
PS	30	

TEST

UNIT 2

Add.

1. $\begin{array}{r} 27 \\ + 32 \\ \hline 59 \end{array}$
2. $\begin{array}{r} 49 \\ + 38 \\ \hline 87 \end{array}$
3. $\begin{array}{r} 457 \\ + 152 \\ \hline 609 \end{array}$
4. $\begin{array}{r} 308 \\ + 589 \\ \hline 897 \end{array}$
5. $8 + 4 + 7 = 19$
6. $27 + 16 + 38 = 81$
7. $94 + 68 + 27 = 189$
8. $27 + 148 + 9 = 184$
9. $324 + 81 + 38 = 443$
10. $800 + 60 + 9 = 869$
11. $\begin{array}{r} 5658 \\ + 3213 \\ \hline 8871 \end{array}$
12. $\begin{array}{r} 3769 \\ + 875 \\ \hline 4644 \end{array}$
13. $\begin{array}{r} 52654 \\ + 4356 \\ \hline 57010 \end{array}$
14. $\begin{array}{r} 91247 \\ + 80126 \\ \hline 171373 \end{array}$

Subtract.

15. $\begin{array}{r} 57 \\ - 23 \\ \hline 34 \end{array}$
16. $\begin{array}{r} 83 \\ - 48 \\ \hline 35 \end{array}$
17. $\begin{array}{r} 675 \\ - 324 \\ \hline 351 \end{array}$
18. $\begin{array}{r} 643 \\ - 218 \\ \hline 425 \end{array}$
19. $\begin{array}{r} 508 \\ - 287 \\ \hline 221 \end{array}$
20. $\begin{array}{r} 5600 \\ - 2343 \\ \hline 3257 \end{array}$
21. $\begin{array}{r} 8030 \\ - 3158 \\ \hline 4872 \end{array}$
22. $\begin{array}{r} 7000 \\ - 1767 \\ \hline 5233 \end{array}$

Subtract. Check by adding.

23. $817 - 528 = 289$
24. $709 - 352 = 357$
25. $600 - 178 = 422$

Add or subtract.

26. $\begin{array}{r} 3.7 \\ + 2.5 \\ \hline 6.2 \end{array}$
27. $\begin{array}{r} 6.23 \\ + 4.38 \\ \hline 10.61 \end{array}$
28. $\begin{array}{r} 43.5 \\ - 4.8 \\ \hline 38.7 \end{array}$
29. $\begin{array}{r} 57.82 \\ - 8.95 \\ \hline 48.87 \end{array}$

Solve.

30. Mt. View School spent \$545.70 for sports equipment and \$339.52 for music supplies. How much was spent all together? $\$885.22$
How much more was spent for sports equipment than for music? $\$206.18$

Post-test

Unit 2

Add.

1. $\begin{array}{r} 47 \\ + 51 \\ \hline 98 \end{array}$
2. $\begin{array}{r} 29 \\ + 29 \\ \hline 58 \end{array}$
3. $\begin{array}{r} 238 \\ + 317 \\ \hline 555 \end{array}$
4. $\begin{array}{r} 409 \\ + 377 \\ \hline 786 \end{array}$
5. $6 + 9 + 2 = 17$
6. $14 + 23 + 56 = 93$
7. $27 + 55 + 35 = 117$
8. $12 + 139 + 4 = 155$
9. $672 + 48 + 95 = 815$
10. $500 + 70 + 2 = 572$
11. $\begin{array}{r} 2731 \\ + 5284 \\ \hline 8015 \end{array}$
12. $\begin{array}{r} 7246 \\ + 394 \\ \hline 7640 \end{array}$
13. $\begin{array}{r} 42182 \\ + 17928 \\ \hline 60110 \end{array}$
14. $\begin{array}{r} 24671 \\ + 7207 \\ \hline 31878 \end{array}$

Subtract.

15. $\begin{array}{r} 88 \\ - 43 \\ \hline 45 \end{array}$
16. $\begin{array}{r} 73 \\ - 59 \\ \hline 14 \end{array}$
17. $\begin{array}{r} 470 \\ - 289 \\ \hline 181 \end{array}$
18. $\begin{array}{r} 982 \\ - 187 \\ \hline 795 \end{array}$

NUMERATION

Write in standard form.

1. $6000 + 400 + 70 + 6$ **6476**
2. $200\,000 + 70\,000 + 5000$ **275\,000**
3. $7\,000\,000 + 6000 + 400 + 70$ **7\,006\,470**
4. sixteen thousand eighty-five **16\,085**
5. ninety-eight million eleven thousand forty-five **98\,011\,045**

What is the place value of the underlined digit?

6. 5783 **hundreds**
7. 60195 **ten thousands**
8. 152671 **thousands**
9. 34 125 617 **hundred thousands**
10. 8642 120 **millions**
11. 905 172 641 **hundred millions**
12. 5.7 **tenths**
13. 13.08 **ones**
14. 4.65 **hundredths**

Copy and complete. Use $<$, $=$, or $>$ for \square .

15. $6715 \square 6175$ **$>$**
16. $4999 \square 5000$ **$<$**
17. $68\,148 \square 68\,248$ **$<$**
18. $4.2 \square 4.02$ **$>$**
19. $31.5 \square 31.6$ **$<$**
20. $0.08 \square 0.8$ **$<$**

Write the decimal.

21. $\frac{6}{10}$ **0.6**
22. $\frac{12}{10}$ **1.2**
23. $\frac{57}{100}$ **0.57**
24. $\frac{9}{100}$ **0.09**
25. $\frac{46}{100}$ **0.46**

Round to the nearest hundred.

26. 871 **900**
27. 652 **700**
28. 8862 **8900**
29. 3065 **3100**
30. 51123 **51100**

Round to the nearest whole number.

31. 5.3 **5.0**
32. 18.9 **19.0**
33. 0.5 **1.0**
34. 4.63 **5.00**
35. 0.75 **1.00**

Write the next three numerals.

36. 7120, 7150, 7180, \square , \square , \square **7210, 7240, 7270**
37. 6.2, 6.4, 6.6, \square , \square , \square **6.8, 7.0, 7.2**
38. 100, 85, 70, \square , \square , \square **55, 40, 25**

19.
$$\begin{array}{r} 607 \\ -232 \\ \hline 375 \end{array}$$
20.
$$\begin{array}{r} 5006 \\ -1871 \\ \hline 3135 \end{array}$$
21.
$$\begin{array}{r} 6081 \\ -2384 \\ \hline 3697 \end{array}$$
22.
$$\begin{array}{r} 7402 \\ -3788 \\ \hline 3614 \end{array}$$

Subtract. Check by adding.

23. $981 - 289 = \underline{692}$
Check: $\underline{289} + \underline{692} = 981$
24. $505 - 346 = \underline{159}$
Check: $\underline{346} + \underline{159} = 505$
25. $900 - 227 = \underline{673}$
Check: $\underline{227} + \underline{673} = 900$

Add or subtract.

26.
$$\begin{array}{r} 3.9 \\ +1.7 \\ \hline 5.6 \end{array}$$
27.
$$\begin{array}{r} 8.6 \\ -4.8 \\ \hline 3.8 \end{array}$$
28.
$$\begin{array}{r} 13.92 \\ +6.25 \\ \hline 20.17 \end{array}$$
29.
$$\begin{array}{r} \$47.09 \\ -9.11 \\ \hline \$37.98 \end{array}$$

Solve.

30. The band students from Kirkland School are raising \$1000.00 for a trip to the United States. One weekend they earned \$341.70 by washing cars and \$432.65 in a bake sale. How much more money do they need to earn?
\$225.65

UNIT 3

Multiplication

Theme: Races

Lesson		Objective	Pages
Preview		Review the multiplication facts to 10×10 .	49
1	A10	Multiply a multiple of 10 by a one-digit multiplier.	50-51
2	A11	Multiply a two-digit multiplicand by a one-digit multiplier.	52-53
3	A12	Multiply a multiple of 10, 100, or 1000 by a one-digit multiplier.	54-55
4	A13	Multiply a three- or four-digit multiplicand by a one-digit multiplier.	56-57
5	A14	Multiply a two-digit multiplicand by a multiple of 10.	58-59
6	A15	Multiply a two-digit multiplicand by a two-digit multiplier less than 20.	60-61
7	A16	Multiply a two-digit multiplicand by a two-digit multiplier.	62-63
8	M1	Multiply money.	64-65
9	A17	Multiply a decimal in tenths by a one- or two-digit multiplier.	66-67
10	M2	Estimate and read temperature in degrees Celsius.	68-69
Test		Multiplication	70
Review		Addition and subtraction	71

About This Unit

The aim of this unit is

1. to review and develop skills with one- and two-digit multipliers;
2. to develop skills in estimating products;
3. to develop skills in reading, writing, and multiplying money expressed in dollars and cents;
4. to develop the ability to solve word problems involving multiplication;
5. to develop skills in multiplying tenths;
6. to develop skills in reading and estimating temperature.

The instructional strategy is to develop a cluster of skills sequentially so that the multiplication algorithm becomes firmly established in the student's mind. The content of this unit is essentially a review of Grade 4 multiplication. Each lesson is built on an instructional model that shows why a particular rule applies in a given situation.

The unit uses the theme of *Races* and the lesson examples involve realistic applications.

Ideas

The place-value number blocks provide a good physical model for developing the multiplication algorithm. For example, the following is the multiplication 24×3 shown with number blocks.



Group the rods together. Group the cubes together.



Trade 10 cubes for 1 rod.



7 rods and 2 cubes remain. (7 tens and 2 ones or 72)

10s	1s
2	4
\times	3
7	2

number of cubes in each group
number of groups

Removing the place-value chart leaves the multiplication algorithm.

UNIT 3

MULTIPLICATION



Unit 3 Objective	Test Question	Pages
A10	1, 2	50-51
A11	3-5	52-53
A12	6, 8	54-55
A13	7, 9, 10	56-57
A14	11-13	58-59
A15	14-16	60-61
A16	17-20	62-63
M1	21-25	64-65
A17	26-30	66-67
M2	31	68-69
PS	32-34	

Pretest

Multiply.

1. $\begin{array}{r} 60 \\ \times 7 \\ \hline 420 \end{array}$	2. $\begin{array}{r} 40 \\ \times 5 \\ \hline 200 \end{array}$	3. $\begin{array}{r} 37 \\ \times 8 \\ \hline 296 \end{array}$	4. $\begin{array}{r} 29 \\ \times 6 \\ \hline 174 \end{array}$	5. $\begin{array}{r} 83 \\ \times 7 \\ \hline 581 \end{array}$
6. $\begin{array}{r} 700 \\ \times 2 \\ \hline 1400 \end{array}$	7. $\begin{array}{r} 806 \\ \times 5 \\ \hline 4030 \end{array}$	8. $\begin{array}{r} 2000 \\ \times 8 \\ \hline 16000 \end{array}$	9. $\begin{array}{r} 3106 \\ \times 7 \\ \hline 21742 \end{array}$	10. $\begin{array}{r} 4002 \\ \times 5 \\ \hline 20010 \end{array}$
11. $\begin{array}{r} 42 \\ \times 30 \\ \hline 1260 \end{array}$	12. $\begin{array}{r} 76 \\ \times 40 \\ \hline 3040 \end{array}$	13. $\begin{array}{r} 92 \\ \times 60 \\ \hline 5520 \end{array}$	14. $\begin{array}{r} 47 \\ \times 13 \\ \hline 611 \end{array}$	15. $\begin{array}{r} 85 \\ \times 18 \\ \hline 1530 \end{array}$
16. $\begin{array}{r} 38 \\ \times 12 \\ \hline 456 \end{array}$	17. $\begin{array}{r} 26 \\ \times 43 \\ \hline 1118 \end{array}$	18. $\begin{array}{r} 95 \\ \times 39 \\ \hline 3705 \end{array}$	19. $\begin{array}{r} 26 \\ \times 48 \\ \hline 1248 \end{array}$	20. $\begin{array}{r} 82 \\ \times 67 \\ \hline 5494 \end{array}$

Unit 3

Get Ready

Complete the tables. Follow the race course as you answer.

START

$0 \times 1 = 0$	$10 \times 2 = 20$	$0 \times 3 = 0$	$10 \times 4 = 40$	$0 \times 5 = 0$
$1 \times 1 = 1$	$9 \times 2 = 18$	$1 \times 3 = 3$	$9 \times 4 = 36$	$1 \times 5 = 5$
$2 \times 1 = 2$	$8 \times 2 = 16$	$2 \times 3 = 6$	$8 \times 4 = 32$	$2 \times 5 = 10$
$3 \times 1 = 3$	$7 \times 2 = 14$	$3 \times 3 = 9$	$7 \times 4 = 28$	$3 \times 5 = 15$
$4 \times 1 = 4$	$6 \times 2 = 12$	$4 \times 3 = 12$	$6 \times 4 = 24$	$4 \times 5 = 20$
$5 \times 1 = 5$	$5 \times 2 = 10$	$5 \times 3 = 15$	$5 \times 4 = 20$	$5 \times 5 = 25$
$5 \times 1 = 6$	$4 \times 2 = 8$	$6 \times 3 = 18$	$4 \times 4 = 16$	$6 \times 5 = 30$
$7 \times 1 = 7$	$3 \times 2 = 6$	$7 \times 3 = 21$	$3 \times 4 = 12$	$7 \times 5 = 35$
$8 \times 1 = 8$	$2 \times 2 = 4$	$8 \times 3 = 24$	$2 \times 4 = 8$	$8 \times 5 = 40$
$9 \times 1 = 9$	$1 \times 2 = 2$	$9 \times 3 = 27$	$1 \times 4 = 4$	$9 \times 5 = 45$
$10 \times 1 = 10$	$0 \times 2 = 0$	$10 \times 3 = 30$	$0 \times 4 = 0$	$10 \times 5 = 50$

FINISH

49

UNIT 3

PREVIEW

Suggestions

Discuss the picture on page 48. Does it remind any of the students of experiences they have had? Do they prefer running in competition with others or running individually in order to keep fit?

About the Page

Talk about the race course on page 49. Explain that the successful and speedy completion of the race course will keep the students fit for working well in this unit.

Divide the class into two teams. Ask individual members of one team to read the multiplication fact and individuals from the other team to give the product. (Keep in a rhythm. The answering team should not miss a beat.) After they have completed the race course, have the teams switch roles. Assign page 49 as a timed quiz to check recall of basic facts. More confident students should pair up with weaker students and quiz them on the basic facts.

Enrichment

Students who know the multiplication facts to 10×10 might make flash cards for the elevens, twelves, and thirteens and master these.

- | | | | | |
|--|--|--|--|--|
| 21. $84¢$
$\times 9$
<u>756¢</u> | 22. $\$6.57$
$\times 6$
<u>$\\$39.42$</u> | 23. $\$16.95$
$\times 8$
<u>$\\$135.60$</u> | 24. $\$4.06$
$\times 5$
<u>$\\$20.30$</u> | 25. $\$30.04$
$\times 7$
<u>$\\$210.28$</u> |
| 26. 7.2
$\times 5$
<u>36.0</u> | 27. 4.6
$\times 8$
<u>36.8</u> | 28. 9.7
$\times 16$
<u>155.2</u> | 29. 8.6
$\times 23$
<u>197.8</u> | 30. 4.9
$\times 87$
<u>426.3</u> |

Solve.

- What is the temperature when it is 25°C below the boiling point of water? 75°C
- A bakery prepared 350 loaves of white bread and 240 loaves of rye bread in one hour. How many loaves were prepared in 3 h?
 $1050 \text{ white, } 720 \text{ rye}$
- What is the cost of 7 pineapples at $\$1.29$ per pineapple? $\$9.03$
- Marc skied down a 795 m ski run 9 times. How many metres did he ski in all? 7155 m

UNIT 3 LESSON 1

Objective A10

Multiply a multiple of 10 by a one-digit multiplier.

Introducing the Lesson

Review counting by 2s, 3s, 4s, . . . , 9s. After some speed and confidence has been established switch to counting by 20s, 30s, 40s, . . . , 90s.

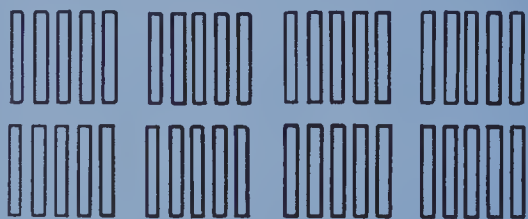
See that the students can count by the multiples of 10 with speed and accuracy. Compare counting by 2s to counting by 20s, 3s to 30s, etc.

Teaching the Lesson

Refer the class to the lesson example at the top of page 50. Point out that the race referred to in the problem is a free-style swimming event. Draw a diagram of the problem.

Ask the students to devise ways to find the total distance that the competitors swim. Solutions might include: a. adding 50 eight times, b. counting by 50s eight times. Show each solution on the chalk-board.

- a. $50 + 50 + 50 + 50 + 50 + 50 + 50 + 50$
 $+ 50 + 50$
 b. 50, 100, 150, 200, 250, 300, 350, 400
 Show a third solution with number blocks.



8 sets of 5 rods, or 8 sets of 10

Ask someone to group the rods into sets of ten and then to trade the 10 rods for 1 flat.

Write the multiplication on the chalkboard in a place-value chart.

c.

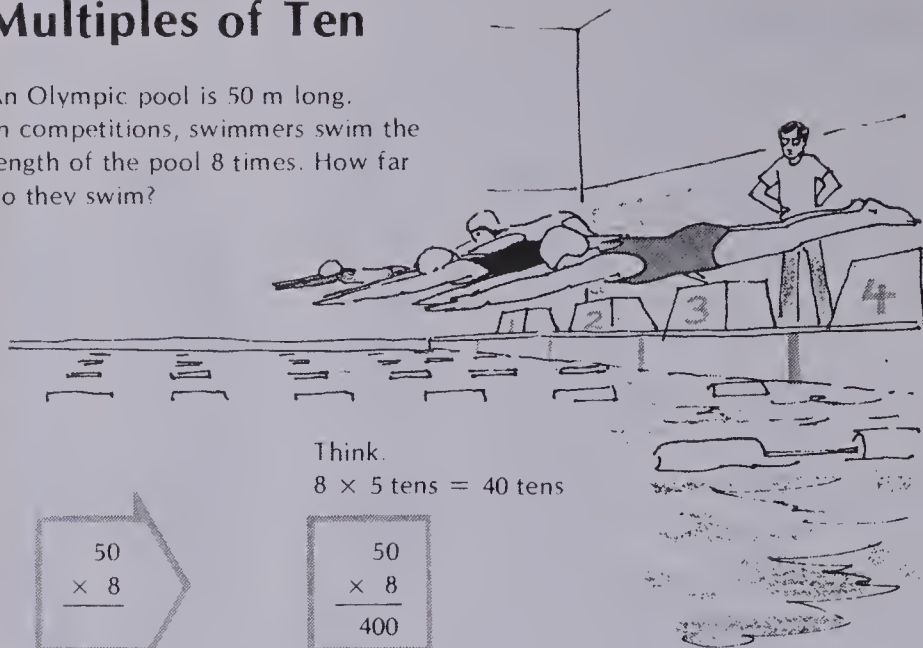
10s	1s
5	0
\times	8
40	0

1. $8 \times 0 \text{ ones} = 0$
 2. $8 \times 5 \text{ tens} = 400$

Show a few similar examples. Have the students mentally compute several examples also.

Multiples of Ten

An Olympic pool is 50 m long. In competitions, swimmers swim the length of the pool 8 times. How far do they swim?



Think.
 $8 \times 5 \text{ tens} = 40 \text{ tens}$

$$\begin{array}{r} 50 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 50 \\ \times 8 \\ \hline 400 \end{array}$$

They swim 400 m

EXERCISES

Multiply.

1. $\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$	2. $\begin{array}{r} 20 \\ \times 2 \\ \hline 40 \end{array}$	3. $\begin{array}{r} 30 \\ \times 2 \\ \hline 60 \end{array}$	4. $\begin{array}{r} 40 \\ \times 2 \\ \hline 80 \end{array}$	5. $\begin{array}{r} 50 \\ \times 2 \\ \hline 100 \end{array}$
6. $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$	7. $\begin{array}{r} 60 \\ \times 4 \\ \hline 240 \end{array}$	8. $\begin{array}{r} 70 \\ \times 4 \\ \hline 280 \end{array}$	9. $\begin{array}{r} 80 \\ \times 4 \\ \hline 320 \end{array}$	10. $\begin{array}{r} 90 \\ \times 4 \\ \hline 360 \end{array}$
11. $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$	12. $\begin{array}{r} 70 \\ \times 8 \\ \hline 560 \end{array}$	13. $\begin{array}{r} 50 \\ \times 8 \\ \hline 400 \end{array}$	14. $\begin{array}{r} 90 \\ \times 8 \\ \hline 720 \end{array}$	15. $\begin{array}{r} 60 \\ \times 8 \\ \hline 480 \end{array}$
16. $\begin{array}{r} 50 \\ \times 3 \\ \hline 150 \end{array}$	17. $\begin{array}{r} 60 \\ \times 5 \\ \hline 300 \end{array}$	18. $\begin{array}{r} 70 \\ \times 7 \\ \hline 490 \end{array}$	19. $\begin{array}{r} 30 \\ \times 9 \\ \hline 270 \end{array}$	20. $\begin{array}{r} 80 \\ \times 6 \\ \hline 480 \end{array}$

50

Using the Exercises

- In each of the first three rows, a basic multiplication fact is reviewed first, then the fact is used in the following problem. The exercises in the rest of the row use the same multiplier but different multiplicands. The last row has five different multipliers.
- Have the students do this page orally before they write the products. Allow them to count by multiples of ten where needed. For example:
 $80 \times 4 = ?$
 $80, 160, 240, 320$
 $80 \times 4 = 320$

PRACTICE

Find the product.

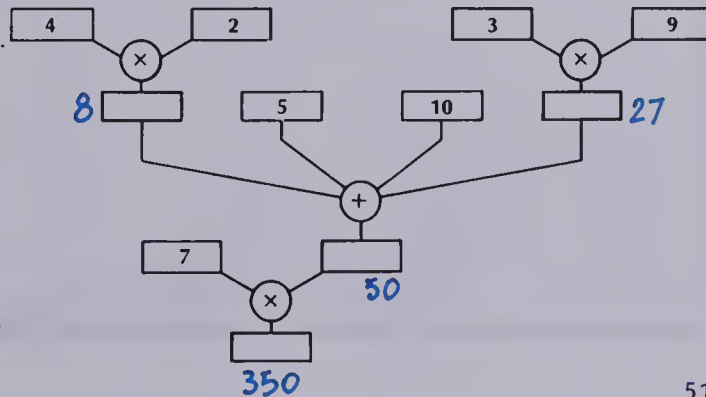
1. $\begin{array}{r} 10 \\ \times 2 \\ \hline 20 \end{array}$
2. $\begin{array}{r} 20 \\ \times 3 \\ \hline 60 \end{array}$
3. $\begin{array}{r} 20 \\ \times 4 \\ \hline 80 \end{array}$
4. $\begin{array}{r} 30 \\ \times 3 \\ \hline 90 \end{array}$
5. $\begin{array}{r} 40 \\ \times 2 \\ \hline 80 \end{array}$
6. $\begin{array}{r} 20 \\ \times 5 \\ \hline 100 \end{array}$
7. $\begin{array}{r} 40 \\ \times 4 \\ \hline 160 \end{array}$
8. $\begin{array}{r} 30 \\ \times 7 \\ \hline 210 \end{array}$
9. $\begin{array}{r} 50 \\ \times 4 \\ \hline 200 \end{array}$
10. $\begin{array}{r} 70 \\ \times 3 \\ \hline 210 \end{array}$
11. $\begin{array}{r} 40 \\ \times 6 \\ \hline 240 \end{array}$
12. $\begin{array}{r} 70 \\ \times 4 \\ \hline 280 \end{array}$
13. $\begin{array}{r} 80 \\ \times 3 \\ \hline 240 \end{array}$
14. $\begin{array}{r} 50 \\ \times 5 \\ \hline 250 \end{array}$
15. $\begin{array}{r} 60 \\ \times 6 \\ \hline 360 \end{array}$
16. $\begin{array}{r} 60 \\ \times 9 \\ \hline 540 \end{array}$
17. $\begin{array}{r} 80 \\ \times 7 \\ \hline 560 \end{array}$
18. $\begin{array}{r} 90 \\ \times 8 \\ \hline 720 \end{array}$
19. $\begin{array}{r} 80 \\ \times 6 \\ \hline 480 \end{array}$
20. $\begin{array}{r} 90 \\ \times 9 \\ \hline 810 \end{array}$

Solve.

21. Dave's little brother swam the 20 m width of the pool 3 times. How far did he swim? **60 m**
22. Eight schools took part in a track meet. Each school sent 30 athletes. How many students took part? **240**
23. How many quarters should you receive in exchange for twenty dollars? **80**

Hopscotch

Find the last number.



51

Assigning the Practice

Minimum: 1-15, 21

Average: 6-23

Enriched: 6-23

Reinforcement

1. Ask the students to complete the following number patterns.

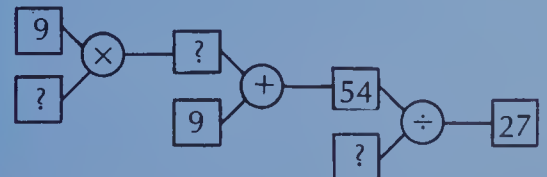
- a. 60, 120, 180, _____, _____, _____, _____.
- b. 90, 180, 270, _____, _____, _____, _____.
- c. 40, 80, 120, _____, _____, _____, _____.
- d. 70, 140, 210, _____, _____, _____, _____.
- e. 30, 60, 90, _____, _____, _____, _____.
- f. 50, 100, 150, _____, _____, _____, _____.
- g. 60, 80, 100, _____, _____, _____, _____.
- h. 250, 300, 350, _____, _____, _____, _____.
- i. 240, 320, 400, _____, _____, _____, _____.
- j. 450, 540, 630, _____, _____, _____, _____.
- k. 350, 420, 490, _____, _____, _____, _____.

2. Have the students complete the following multiplication table.

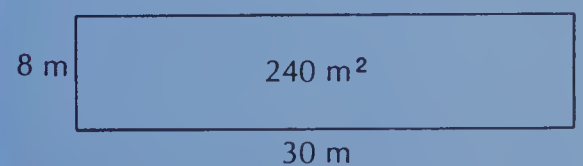
X	80	20	60	70	90	50	40
9							
4							
7							
5							
3							
8							
6							
2							

Enrichment

1. Assign *Hopscotch* at the bottom of page 51. For an extra challenge, ask the students to find the missing numbers in this puzzle.



2. Ask the students to name all the other possible lengths and widths of a rectangle that also would give an area of 240 m².



Extra Practice

Find the product.

1. $\begin{array}{r} 60 \\ \times 8 \\ \hline 480 \end{array}$
2. $\begin{array}{r} 30 \\ \times 9 \\ \hline 270 \end{array}$
3. $\begin{array}{r} 80 \\ \times 8 \\ \hline 640 \end{array}$
4. $\begin{array}{r} 90 \\ \times 6 \\ \hline 540 \end{array}$
5. $\begin{array}{r} 80 \\ \times 5 \\ \hline 400 \end{array}$
6. $\begin{array}{r} 90 \\ \times 5 \\ \hline 450 \end{array}$
7. $\begin{array}{r} 20 \\ \times 7 \\ \hline 140 \end{array}$
8. $\begin{array}{r} 70 \\ \times 9 \\ \hline 630 \end{array}$
9. $\begin{array}{r} 40 \\ \times 7 \\ \hline 280 \end{array}$
10. $\begin{array}{r} 60 \\ \times 9 \\ \hline 540 \end{array}$

Solve.

11. There is a traffic tie-up on the highway. Eighty cars are lined up bumper to bumper. If each car is about 5 m long, about how long is the line? **400 m**
12. A kite string is made up of 6 separate lengths. If each piece is 20 m long, how long is the string? **120 m**

Worksheet A10

Pages 50-51

Objective A11

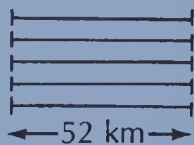
Multiply a two-digit multiplicand by a one-digit factor.

Introducing the Lesson

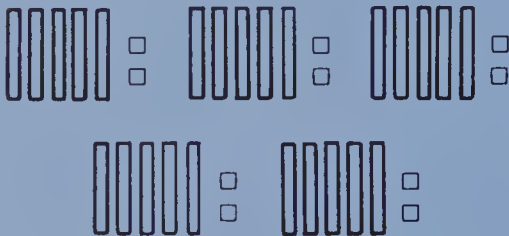
Review the multiplication terms, *factor* and *product* with these kinds of questions:
 "Name two factors having a product of 48."
 "What is the product of 9 and 4?"
 "For the product of 56, one factor is seven. What is the other factor?"

Teaching the Lesson

Read and discuss the problem at the top of page 52. Draw a diagram of the problem and have the students offer suggestions for its solution.



Explain that adding 52 five times solves the problem but that multiplying 52×5 is faster. Model 52×5 with place-value number blocks.



Have someone group the 10 cubes together and trade them for 1 rod. Then the 26 rods can be grouped together and traded for 2 flats and 6 rods, or 2 hundreds and 6 tens.



Write the multiplication in a place-value chart as a summary of the number block activity.

100s	10s	1s
	5	2
	\times	5
2	6	0

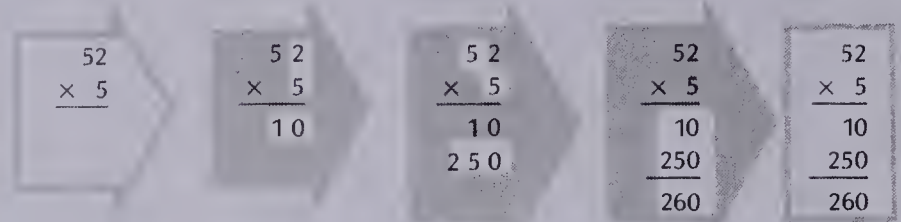
Model and record several other similar examples.

One- and Two-Digit Factors

Hans wanted to enter a 52 km cycling race. He practised cycling this distance 5 times before the race. How far did he cycle in all of his practice races?

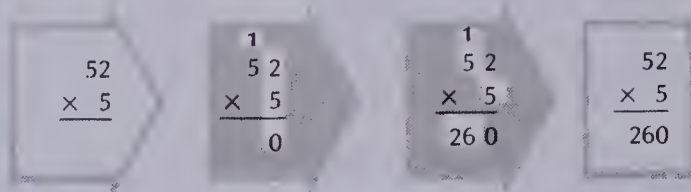


Multiply 5×2 ones. Multiply 5×5 tens. Add.



Hans cycled 260 km in all.

You can do this a short way.



EXERCISES

Multiply.

1. $\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$	2. $\begin{array}{r} 20 \\ \times 3 \\ \hline 60 \end{array}$	3. $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$	4. $\begin{array}{r} 53 \\ \times 3 \\ \hline 159 \end{array}$	5. $\begin{array}{r} 53 \\ \times 2 \\ \hline 106 \end{array}$
6. $\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$	7. $\begin{array}{r} 30 \\ \times 2 \\ \hline 60 \end{array}$	8. $\begin{array}{r} 36 \\ \times 2 \\ \hline 72 \end{array}$	9. $\begin{array}{r} 56 \\ \times 2 \\ \hline 112 \end{array}$	10. $\begin{array}{r} 56 \\ \times 3 \\ \hline 168 \end{array}$
11. $\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$	12. $\begin{array}{r} 40 \\ \times 7 \\ \hline 280 \end{array}$	13. $\begin{array}{r} 45 \\ \times 7 \\ \hline 315 \end{array}$	14. $\begin{array}{r} 65 \\ \times 7 \\ \hline 455 \end{array}$	15. $\begin{array}{r} 65 \\ \times 8 \\ \hline 520 \end{array}$

52

Using the Exercises

- Each row of problems begins with a basic fact and then uses that fact to develop multiplications with one 2-digit factor. Work some examples together emphasizing the regrouping process.

PRACTICE

Find the product.

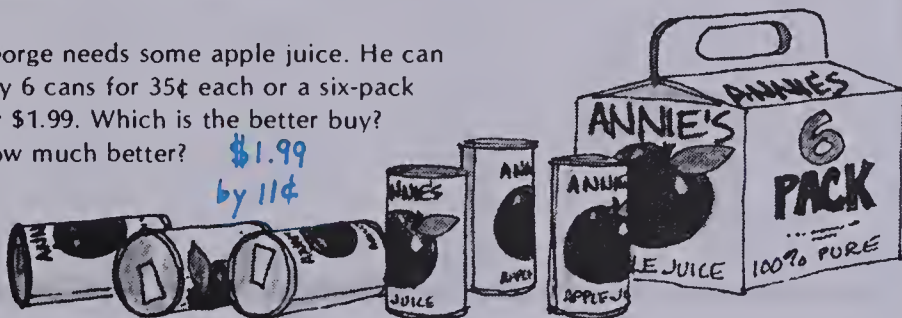
- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$ | 2. $\begin{array}{r} 32 \\ \times 3 \\ \hline 96 \end{array}$ | 3. $\begin{array}{r} 44 \\ \times 2 \\ \hline 88 \end{array}$ | 4. $\begin{array}{r} 24 \\ \times 2 \\ \hline 48 \end{array}$ | 5. $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$ |
| 6. $\begin{array}{r} 43 \\ \times 3 \\ \hline 129 \end{array}$ | 7. $\begin{array}{r} 54 \\ \times 2 \\ \hline 108 \end{array}$ | 8. $\begin{array}{r} 52 \\ \times 3 \\ \hline 156 \end{array}$ | 9. $\begin{array}{r} 61 \\ \times 4 \\ \hline 244 \end{array}$ | 10. $\begin{array}{r} 72 \\ \times 3 \\ \hline 216 \end{array}$ |
| 11. $\begin{array}{r} 25 \\ \times 5 \\ \hline 125 \end{array}$ | 12. $\begin{array}{r} 36 \\ \times 3 \\ \hline 108 \end{array}$ | 13. $\begin{array}{r} 27 \\ \times 4 \\ \hline 108 \end{array}$ | 14. $\begin{array}{r} 18 \\ \times 5 \\ \hline 90 \end{array}$ | 15. $\begin{array}{r} 39 \\ \times 6 \\ \hline 234 \end{array}$ |
| 16. $\begin{array}{r} 44 \\ \times 7 \\ \hline 308 \end{array}$ | 17. $\begin{array}{r} 45 \\ \times 8 \\ \hline 360 \end{array}$ | 18. $\begin{array}{r} 54 \\ \times 5 \\ \hline 270 \end{array}$ | 19. $\begin{array}{r} 36 \\ \times 6 \\ \hline 216 \end{array}$ | 20. $\begin{array}{r} 24 \\ \times 7 \\ \hline 168 \end{array}$ |
| 21. $\begin{array}{r} 67 \\ \times 8 \\ \hline 536 \end{array}$ | 22. $\begin{array}{r} 78 \\ \times 7 \\ \hline 546 \end{array}$ | 23. $\begin{array}{r} 86 \\ \times 9 \\ \hline 774 \end{array}$ | 24. $\begin{array}{r} 79 \\ \times 8 \\ \hline 632 \end{array}$ | 25. $\begin{array}{r} 98 \\ \times 9 \\ \hline 882 \end{array}$ |

Solve.

26. Mr. Savio wants to barbecue 4 steaks. His grill can cook only one steak at a time and each steak takes 13 min. How much time must he allow for cooking? **52 min**
27. Hillside School has 8 classrooms. Each room has 34 pupils. How many pupils attend in all? **272**

Consumer Problem

George needs some apple juice. He can buy 6 cans for 35¢ each or a six-pack for \$1.99. Which is the better buy? How much better?



53

Assigning the Practice

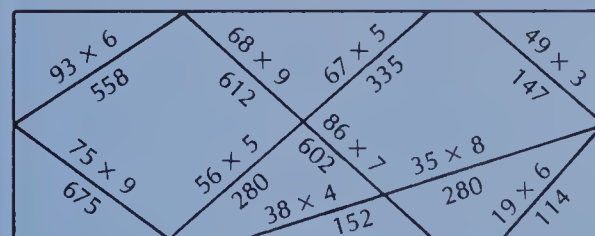
Minimum: 1-15, 26

Average: 1-20, 26-27

Enriched: 6-27

Reinforcement

- Assign *Consumer Problem* at the bottom of page 53.
- Ask the students to cut out the following puzzle, mix the pieces, and then put it back together again. The puzzle solution can be glued to stiff paper.



- Have the students give the missing output numbers.

× 6	
in	out
76	
45	
82	
75	
91	

× 8	
in	out
46	
35	
18	
79	
88	

× 7	
in	out
91	
14	
67	
58	
25	

Enrichment

- Ask the students to find the missing factor in the following problems.
 - $64 \times ? = 576$
 - $29 \times ? = 87$
 - $? \times 7 = 392$
 - $? \times 6 = 486$
 - $95 \times ? = 380$
 - $? \times 6 = 438$

- Have the students complete this equation in as many ways as possible.
 $(\blacksquare \times \blacktriangle) + 16 = 191$

Extra Practice

Multiply.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 34 \\ \times 2 \\ \hline 68 \end{array}$ | 2. $\begin{array}{r} 63 \\ \times 3 \\ \hline 189 \end{array}$ | 3. $\begin{array}{r} 28 \\ \times 4 \\ \hline 112 \end{array}$ | 4. $\begin{array}{r} 35 \\ \times 5 \\ \hline 175 \end{array}$ | 5. $\begin{array}{r} 36 \\ \times 8 \\ \hline 288 \end{array}$ |
| 6. $\begin{array}{r} 54 \\ \times 4 \\ \hline 216 \end{array}$ | 7. $\begin{array}{r} 76 \\ \times 3 \\ \hline 228 \end{array}$ | 8. $\begin{array}{r} 38 \\ \times 5 \\ \hline 190 \end{array}$ | 9. $\begin{array}{r} 84 \\ \times 2 \\ \hline 168 \end{array}$ | 10. $\begin{array}{r} 58 \\ \times 3 \\ \hline 174 \end{array}$ |
| 11. $\begin{array}{r} 67 \\ \times 6 \\ \hline 402 \end{array}$ | 12. $\begin{array}{r} 78 \\ \times 7 \\ \hline 546 \end{array}$ | 13. $\begin{array}{r} 94 \\ \times 8 \\ \hline 752 \end{array}$ | 14. $\begin{array}{r} 76 \\ \times 3 \\ \hline 228 \end{array}$ | 15. $\begin{array}{r} 58 \\ \times 5 \\ \hline 290 \end{array}$ |

Solve.

16. Joan wants to buy 6 cans of pop. Each can costs 38¢. How much money does she need? **\$2.28**

Worksheet A11

Pages 52-53

Objective A12

Multiply a multiple of 10, 100, or 1000 by a one-digit multiplier.

Introducing the Lesson

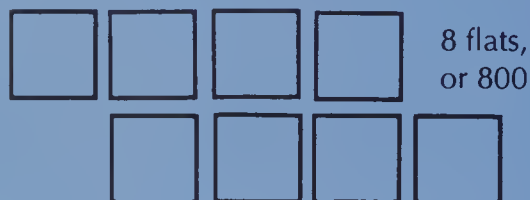
Review counting by multiples of 100 and by multiples of 1000 with the following kinds of questions.

- Count by 600s from 600 to 5400.
- Count by 900s from 1800 to 6300.
- Count by 3000s from 3000 to 27 000.
- Count by 8000s from 16 000 to 64 000.

Ask someone to record the counting on the chalkboard.

Teaching the Lesson

Read and discuss the problem at the top of page 54. Note that the solution can be found by counting by 400s twice, by adding $400 + 400$, and by multiplying 400×2 . Model the multiplication with number blocks and record it in a place-value chart.



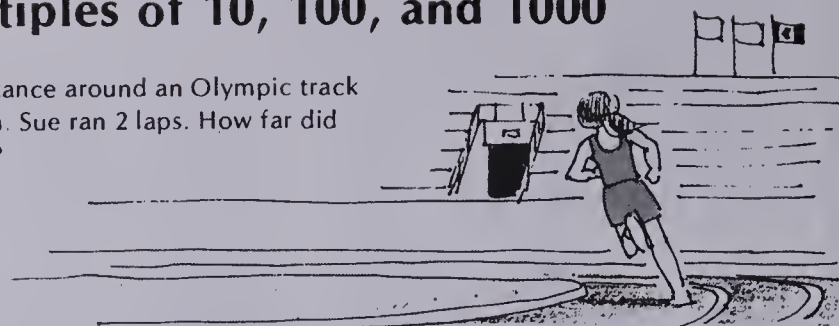
100s	10s	1s	
4	0	0	$2 \times 0 \text{ ones} = 0$
\times		2	$2 \times 0 \text{ tens} = 0$
8	0	0	$2 \times 4 \text{ hundreds} = 800$

Model a few other examples as well, especially those involving a multiple of 1000.

Orally give the students several similar multiplications to encourage the use of *mental computation* for the solving of these kinds of problems. Encourage the students to discover the zero patterns involved.

Multiples of 10, 100, and 1000

The distance around an Olympic track is 400 m. Sue ran 2 laps. How far did she run?



Multiply
 $2 \times 0 \text{ ones and}$
 $2 \times 0 \text{ tens.}$

Multiply
 $2 \times 4 \text{ hundreds.}$

$$\begin{array}{r} 400 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 400 \\ \times 2 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 400 \\ \times 2 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 400 \\ \times 2 \\ \hline 800 \end{array}$$

Sue ran 800 m.

EXERCISES

Multiply.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$ | 2. $\begin{array}{r} 30 \\ \times 3 \\ \hline 90 \end{array}$ | 3. $\begin{array}{r} 300 \\ \times 3 \\ \hline 900 \end{array}$ | 4. $\begin{array}{r} 3000 \\ \times 3 \\ \hline 9000 \end{array}$ | 5. $\begin{array}{r} 2000 \\ \times 3 \\ \hline 6000 \end{array}$ |
| 6. $\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$ | 7. $\begin{array}{r} 50 \\ \times 5 \\ \hline 250 \end{array}$ | 8. $\begin{array}{r} 500 \\ \times 5 \\ \hline 2500 \end{array}$ | 9. $\begin{array}{r} 5000 \\ \times 5 \\ \hline 25000 \end{array}$ | 10. $\begin{array}{r} 4000 \\ \times 5 \\ \hline 20000 \end{array}$ |
| 11. $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$ | 12. $\begin{array}{r} 90 \\ \times 7 \\ \hline 630 \end{array}$ | 13. $\begin{array}{r} 900 \\ \times 7 \\ \hline 6300 \end{array}$ | 14. $\begin{array}{r} 9000 \\ \times 7 \\ \hline 63000 \end{array}$ | 15. $\begin{array}{r} 8000 \\ \times 7 \\ \hline 56000 \end{array}$ |
| 16. $\begin{array}{r} 500 \\ \times 4 \\ \hline 2000 \end{array}$ | 17. $\begin{array}{r} 800 \\ \times 6 \\ \hline 4800 \end{array}$ | 18. $\begin{array}{r} 700 \\ \times 5 \\ \hline 3500 \end{array}$ | 19. $\begin{array}{r} 4000 \\ \times 8 \\ \hline 32000 \end{array}$ | 20. $\begin{array}{r} 5000 \\ \times 9 \\ \hline 45000 \end{array}$ |

Using the Exercises

- The first three rows carefully develop the concept of multiplying with multiples of 10, 100, and 1000. Students should thereby be assisted in determining the number of zeros in each product. See that five-digit products are recorded with the space between the hundreds and thousands place, e.g.: $7000 \times 4 = 28\ 000$.

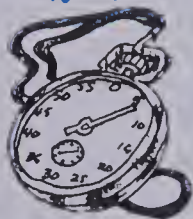
PRACTICE

Find the product.

1. $\begin{array}{r} 70 \\ \times 7 \\ \hline 490 \end{array}$
2. $\begin{array}{r} 50 \\ \times 9 \\ \hline 450 \end{array}$
3. $\begin{array}{r} 80 \\ \times 6 \\ \hline 480 \end{array}$
4. $\begin{array}{r} 60 \\ \times 7 \\ \hline 420 \end{array}$
5. $\begin{array}{r} 90 \\ \times 8 \\ \hline 720 \end{array}$
6. $\begin{array}{r} 600 \\ \times 5 \\ \hline 3000 \end{array}$
7. $\begin{array}{r} 800 \\ \times 8 \\ \hline 6400 \end{array}$
8. $\begin{array}{r} 400 \\ \times 9 \\ \hline 3600 \end{array}$
9. $\begin{array}{r} 900 \\ \times 6 \\ \hline 5400 \end{array}$
10. $\begin{array}{r} 700 \\ \times 6 \\ \hline 4200 \end{array}$
11. $\begin{array}{r} 5000 \\ \times 8 \\ \hline 40\,000 \end{array}$
12. $\begin{array}{r} 3000 \\ \times 9 \\ \hline 27\,000 \end{array}$
13. $\begin{array}{r} 8000 \\ \times 7 \\ \hline 56\,000 \end{array}$
14. $\begin{array}{r} 6000 \\ \times 8 \\ \hline 48\,000 \end{array}$
15. $\begin{array}{r} 9000 \\ \times 9 \\ \hline 81\,000 \end{array}$
16. $\begin{array}{r} 700 \\ \times 9 \\ \hline 6300 \end{array}$
17. $\begin{array}{r} 80 \\ \times 8 \\ \hline 640 \end{array}$
18. $\begin{array}{r} 6000 \\ \times 9 \\ \hline 54\,000 \end{array}$
19. $\begin{array}{r} 900 \\ \times 7 \\ \hline 6300 \end{array}$
20. $\begin{array}{r} 5000 \\ \times 8 \\ \hline 40\,000 \end{array}$

Solve.

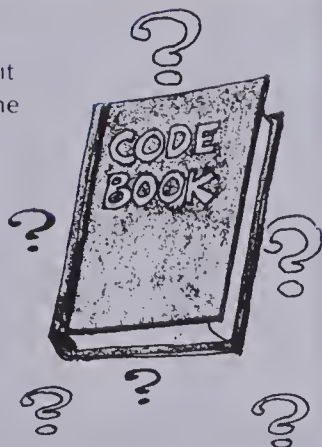
21. How many metres are there in 9 km? **9000 m**
22. Ria is running the 400 m track. How far does she go in 7 complete laps? **2800 m**
23. A school gym is 20 m wide. Nancy runs its width and back 3 times. How far does she run? **120 m**



Letter Logic

Each different letter below stands for a different digit (0 stands for zero.) Discover the code and rewrite the problems with numerals

$\begin{array}{r} B0F \\ \times 4 \\ \hline A004 \end{array}$	$\begin{array}{r} A0B \\ \times 4 \\ \hline CA0 \end{array}$	$\begin{array}{r} D0C \\ \times 4 \\ \hline FADA \end{array}$
A = 2	B = 5	C = 8
D = 3	F = 1	



55

Assigning the Practice

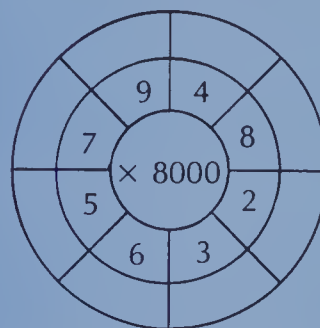
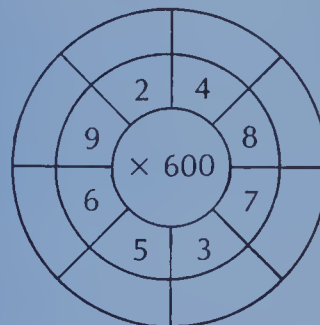
Minimum: 1-22

Average: 1-23

Enriched: 1-23

Reinforcement

1. Have the students fill in the missing products in the outer rings.



2. Ask the students to complete the following number patterns.

- a. 400, 800, 1200, _____, _____
- b. 700, 1400, 2100, _____, _____
- c. 1500, 2000, 2500, _____, _____
- d. 9000, 18 000, 27 000, _____, _____
- e. 3000, 6000, 9000, _____, _____
- f. 24 000, 32 000, 40 000, _____, _____

Enrichment

1. Assign *Letter Logic* at the bottom of page 55.
2. Have the students investigate zero patterns as they multiply problems similar to these.
 - a. $70\,000 \times 6$
 - b. $400\,000 \times 3$
 - c. $5\,000\,000 \times 7$
 - d. $90\,000\,000 \times 5$
 - e. $800\,000\,000 \times 4$

Extra Practice

Multiply.

1. $\begin{array}{r} 60 \\ \times 7 \\ \hline 420 \end{array}$
2. $\begin{array}{r} 40 \\ \times 6 \\ \hline 240 \end{array}$
3. $\begin{array}{r} 70 \\ \times 8 \\ \hline 560 \end{array}$
4. $\begin{array}{r} 90 \\ \times 7 \\ \hline 630 \end{array}$
5. $\begin{array}{r} 50 \\ \times 8 \\ \hline 400 \end{array}$
6. $\begin{array}{r} 500 \\ \times 4 \\ \hline 2000 \end{array}$
7. $\begin{array}{r} 800 \\ \times 9 \\ \hline 7200 \end{array}$
8. $\begin{array}{r} 600 \\ \times 8 \\ \hline 4800 \end{array}$
9. $\begin{array}{r} 400 \\ \times 3 \\ \hline 1200 \end{array}$
10. $\begin{array}{r} 700 \\ \times 9 \\ \hline 6300 \end{array}$
11. $\begin{array}{r} 7000 \\ \times 7 \\ \hline 49\,000 \end{array}$
12. $\begin{array}{r} 9000 \\ \times 6 \\ \hline 54\,000 \end{array}$
13. $\begin{array}{r} 8000 \\ \times 7 \\ \hline 56\,000 \end{array}$
14. $\begin{array}{r} 5000 \\ \times 6 \\ \hline 30\,000 \end{array}$
15. $\begin{array}{r} 6000 \\ \times 8 \\ \hline 48\,000 \end{array}$

Solve.

16. One of the cars in a race averaged 200 km/h. How far would the car travel in 3 h? **600 km**
17. How many centimetres are there in 7 m? **700 cm**

Worksheet A12

Pages 54-55

Objective A13

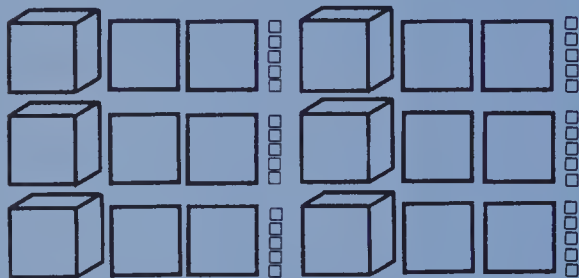
Multiply a three- or four-digit multiplicand by a one-digit multiplier.

Introducing the Lesson

Discuss the sport of skiing pictured on page 56. Ask the students where in Canada they have skied and to approximate the lengths of the ski runs and the distances they might have skied in one day.

Teaching the Lesson

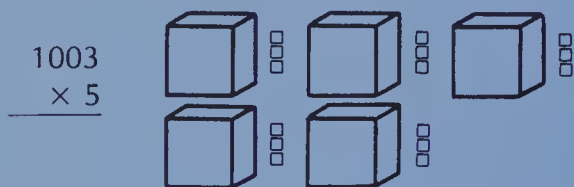
Read and discuss the problem at the top of page 56. Explain the required multiplication first with place-value number blocks. Stress the regrouping involved.



30 cubes are regrouped as 3 rods, 0 cubes. 12 flats are regrouped as 1 block, 2 flats. 7 blocks, 2 flats, 3 rods, 0 cubes remain. (7000 + 200 + 30 + 0 or 7230)

Record the multiplication in a place-value chart. Point out how the ones, tens, hundreds, and thousands are multiplied.

Practise several similar examples. Be sure to include a few examples having zeros in the multiplicand. Show these with the number-block models and the multiplication algorithm. For example:



15 cubes are regrouped as 1 rod, 5 cubes. 5 blocks, 1 rod, 5 cubes remain. 5000 + 10 + 5 = 5015

$$\begin{array}{r} 1003 \\ \times 5 \\ \hline 15 \\ 000 \\ 5000 \\ \hline 5015 \end{array} \quad \text{or} \quad \begin{array}{r} 1003 \\ \times 5 \\ \hline 5015 \end{array}$$

Three- and Four-Digit Factors

Mario practises skiing on a 1205 m ski run. One day he raced down the run 6 times. How far did he ski in all?



He skied 7230 m in all.

Multiply.

$$\begin{array}{r} 1205 \\ \times 6 \\ \hline 30 \\ 00 \\ 1200 \\ 6000 \\ \hline \end{array}$$

Add.

$$\begin{array}{r} 1205 \\ \times 6 \\ \hline 30 \\ 00 \\ 1200 \\ 6000 \\ \hline 7230 \end{array}$$

You can do this a short way.

$$\begin{array}{r} 1205 \\ \times 6 \\ \hline 7230 \end{array}$$

EXERCISES

Multiply.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$ | 2. $\begin{array}{r} 30 \\ \times 2 \\ \hline 60 \end{array}$ | 3. $\begin{array}{r} 200 \\ \times 2 \\ \hline 400 \end{array}$ | 4. $\begin{array}{r} 234 \\ \times 2 \\ \hline 468 \end{array}$ | 5. $\begin{array}{r} 5234 \\ \times 2 \\ \hline 10468 \end{array}$ |
| 6. $\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$ | 7. $\begin{array}{r} 10 \\ \times 4 \\ \hline 40 \end{array}$ | 8. $\begin{array}{r} 300 \\ \times 4 \\ \hline 1200 \end{array}$ | 9. $\begin{array}{r} 315 \\ \times 4 \\ \hline 1260 \end{array}$ | 10. $\begin{array}{r} 2315 \\ \times 4 \\ \hline 9260 \end{array}$ |
| 11. $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$ | 12. $\begin{array}{r} 40 \\ \times 6 \\ \hline 240 \end{array}$ | 13. $\begin{array}{r} 500 \\ \times 6 \\ \hline 3000 \end{array}$ | 14. $\begin{array}{r} 546 \\ \times 6 \\ \hline 3276 \end{array}$ | 15. $\begin{array}{r} 3546 \\ \times 6 \\ \hline 21276 \end{array}$ |
| 16. $\begin{array}{r} 400 \\ \times 7 \\ \hline 2800 \end{array}$ | 17. $\begin{array}{r} 480 \\ \times 7 \\ \hline 3360 \end{array}$ | 18. $\begin{array}{r} 408 \\ \times 7 \\ \hline 2856 \end{array}$ | 19. $\begin{array}{r} 4800 \\ \times 7 \\ \hline 33600 \end{array}$ | 20. $\begin{array}{r} 4008 \\ \times 7 \\ \hline 28056 \end{array}$ |

Using the Exercises

- The problems in this section are developmentally arranged to point out the meaning of place value in multiplication. Check that students leave a space between the hundreds and the thousands in five-digit products. Multiplications with zeros in the multiplicand should also be checked as students often make mistakes with these.

PRACTICE

Find the product.

1. $\begin{array}{r} 123 \\ \times 2 \\ \hline 246 \end{array}$
2. $\begin{array}{r} 233 \\ \times 3 \\ \hline 699 \end{array}$
3. $\begin{array}{r} 342 \\ \times 2 \\ \hline 684 \end{array}$
4. $\begin{array}{r} 1234 \\ \times 2 \\ \hline 2468 \end{array}$
5. $\begin{array}{r} 2303 \\ \times 3 \\ \hline 6909 \end{array}$
6. $\begin{array}{r} 245 \\ \times 2 \\ \hline 490 \end{array}$
7. $\begin{array}{r} 316 \\ \times 5 \\ \hline 1580 \end{array}$
8. $\begin{array}{r} 204 \\ \times 4 \\ \hline 816 \end{array}$
9. $\begin{array}{r} 2306 \\ \times 3 \\ \hline 6918 \end{array}$
10. $\begin{array}{r} 2215 \\ \times 4 \\ \hline 8860 \end{array}$
11. $\begin{array}{r} 435 \\ \times 9 \\ \hline 3915 \end{array}$
12. $\begin{array}{r} 634 \\ \times 7 \\ \hline 4438 \end{array}$
13. $\begin{array}{r} 406 \\ \times 6 \\ \hline 2436 \end{array}$
14. $\begin{array}{r} 3157 \\ \times 5 \\ \hline 15785 \end{array}$
15. $\begin{array}{r} 3008 \\ \times 6 \\ \hline 18048 \end{array}$
16. $\begin{array}{r} 608 \\ \times 7 \\ \hline 4256 \end{array}$
17. $\begin{array}{r} 879 \\ \times 8 \\ \hline 7032 \end{array}$
18. $\begin{array}{r} 977 \\ \times 9 \\ \hline 8793 \end{array}$
19. $\begin{array}{r} 5679 \\ \times 8 \\ \hline 45432 \end{array}$
20. $\begin{array}{r} 6007 \\ \times 7 \\ \hline 42049 \end{array}$

Solve.

21. A monthly magazine had 6183 subscribers. How many magazines did it mail out in 6 months? **37 098**
22. Ms Cunningham's private jet flies at 945 kilometres per hour. How far does it fly in 8 h? **7560 km**

REVIEW

Multiply.

- | | | | | | |
|-----|---|---|---|---|---|
| A10 | 1. $\begin{array}{r} 40 \\ \times 3 \\ \hline 120 \end{array}$ | 2. $\begin{array}{r} 50 \\ \times 6 \\ \hline 300 \end{array}$ | 3. $\begin{array}{r} 70 \\ \times 8 \\ \hline 560 \end{array}$ | 4. $\begin{array}{r} 90 \\ \times 7 \\ \hline 630 \end{array}$ | 5. $\begin{array}{r} 80 \\ \times 9 \\ \hline 720 \end{array}$ |
| | 6. $\begin{array}{r} 35 \\ \times 6 \\ \hline 210 \end{array}$ | 7. $\begin{array}{r} 78 \\ \times 4 \\ \hline 312 \end{array}$ | 8. $\begin{array}{r} 29 \\ \times 3 \\ \hline 87 \end{array}$ | 9. $\begin{array}{r} 65 \\ \times 8 \\ \hline 520 \end{array}$ | 10. $\begin{array}{r} 59 \\ \times 7 \\ \hline 413 \end{array}$ |
| A12 | 11. $\begin{array}{r} 700 \\ \times 6 \\ \hline 4200 \end{array}$ | 12. $\begin{array}{r} 500 \\ \times 8 \\ \hline 4000 \end{array}$ | 13. $\begin{array}{r} 6000 \\ \times 4 \\ \hline 24000 \end{array}$ | 14. $\begin{array}{r} 9000 \\ \times 8 \\ \hline 72000 \end{array}$ | |
| | 15. $\begin{array}{r} 575 \\ \times 4 \\ \hline 2300 \end{array}$ | 16. $\begin{array}{r} 709 \\ \times 6 \\ \hline 4254 \end{array}$ | 17. $\begin{array}{r} 2473 \\ \times 7 \\ \hline 17311 \end{array}$ | 18. $\begin{array}{r} 5006 \\ \times 5 \\ \hline 25030 \end{array}$ | |

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Assigning the Practice

Minimum: 1-12, 21

Average: 1-15, 21-22

Enriched: 6-22

Review Exercises

Questions	Objective	Pages
1-5	A10	50-51
6-10	A11	52-53
11-14	A12	54-55
15-18	A13	56-57

Reinforcement

1. Ask the students to complete the following multiplication table.

\times	5	9	8	6	4	7
72						
135						
643						
89						
7008						
1043						

2. Have the students find and then explain the mistakes in these problems.

a. $\begin{array}{r} 793 \\ \times 6 \\ \hline 4778 \end{array}$	b. $\begin{array}{r} 9004 \\ \times 6 \\ \hline 5424 \end{array}$	c. $\begin{array}{r} 1756 \\ \times 8 \\ \hline 8048 \end{array}$
--	---	---

Enrichment

Have the students find the missing digits.

a. $\begin{array}{r} 6\blacksquare\blacksquare \\ \times 8 \\ \hline 5080 \end{array}$	b. $\begin{array}{r} 3\blacksquare\blacksquare7 \\ \times 9 \\ \hline 27603 \end{array}$
c. $\begin{array}{r} \blacksquare\blacksquare\blacksquare \\ \times 7 \\ \hline 1792 \end{array}$	d. $\begin{array}{r} 7562 \\ \times \blacksquare \\ \hline 45372 \end{array}$

Extra Practice

Find the product.

1. $\begin{array}{r} 321 \\ \times 3 \\ \hline 963 \end{array}$
2. $\begin{array}{r} 219 \\ \times 5 \\ \hline 1095 \end{array}$
3. $\begin{array}{r} 436 \\ \times 4 \\ \hline 1744 \end{array}$
4. $\begin{array}{r} 602 \\ \times 3 \\ \hline 1806 \end{array}$
5. $\begin{array}{r} 780 \\ \times 9 \\ \hline 7020 \end{array}$
6. $\begin{array}{r} 654 \\ \times 6 \\ \hline 3924 \end{array}$
7. $\begin{array}{r} 738 \\ \times 7 \\ \hline 5166 \end{array}$
8. $\begin{array}{r} 495 \\ \times 8 \\ \hline 3960 \end{array}$
9. $\begin{array}{r} 3187 \\ \times 3 \\ \hline 9561 \end{array}$
10. $\begin{array}{r} 2564 \\ \times 5 \\ \hline 12820 \end{array}$
11. $\begin{array}{r} 3219 \\ \times 3 \\ \hline 9657 \end{array}$
12. $\begin{array}{r} 4168 \\ \times 2 \\ \hline 8336 \end{array}$
13. $\begin{array}{r} 9876 \\ \times 7 \\ \hline 69132 \end{array}$
14. $\begin{array}{r} 7081 \\ \times 7 \\ \hline 49567 \end{array}$
15. $\begin{array}{r} 9002 \\ \times 3 \\ \hline 27006 \end{array}$

Solve.

16. A factory manufactures 2450 pairs of shoes in a week. How many pairs of shoes will it make in 4 weeks? **9800**

Worksheet A13

Pages 56-57

Objective A14

Multiply a two-digit multiplicand by a multiple of 10.

Introducing the Lesson

Pass out place-value number blocks. Ask the students to show what is ten times greater than 3 cubes. (3 rods.)



What is ten times greater than 7 cubes? (7 rods.)

Record these multiplications on the chalkboard. Let the students discover the pattern of the zero in the products as you multiply by ten.

$$\begin{array}{l} 3 \times 1 = 3 \\ 7 \times 1 = 7 \end{array} \quad \begin{array}{l} 3 \times 10 = 30 \\ 7 \times 10 = 70 \end{array}$$

Teaching the Lesson

Read and discuss the problem at the top of page 58. Review the multiplication of 12×5 at the chalkboard. Show how the product of 12×50 is the same as the product of 12×5 with a zero added on.

$$\begin{array}{r} 12 \\ \times 5 \\ \hline 60 \end{array} \quad \begin{array}{r} 12 \\ \times 50 \\ \hline 600 \end{array}$$

Practise with examples like these until the students see how the zero is added on.

$$\begin{array}{r} 22 \\ \times 4 \\ \hline 88 \end{array} \quad \begin{array}{r} 22 \\ \times 40 \\ \hline 880 \end{array}$$

$$\begin{array}{r} 36 \\ \times 2 \\ \hline 72 \end{array} \quad \begin{array}{r} 32 \\ \times 20 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 51 \\ \times 6 \\ \hline 306 \end{array} \quad \begin{array}{r} 51 \\ \times 60 \\ \hline 3060 \end{array}$$

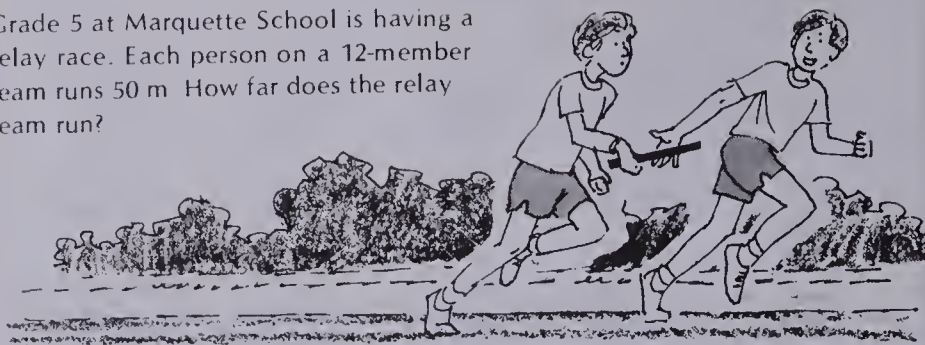
$$\begin{array}{r} 75 \\ \times 2 \\ \hline 150 \end{array} \quad \begin{array}{r} 75 \\ \times 20 \\ \hline 1500 \end{array}$$

Explain the multiplication algorithm for these kinds of problems.

$$\begin{array}{r} 12 \\ \times 50 \\ \hline \end{array} \text{ "Write zero in the product and multiply by 5."}$$

Multiples of Ten

Grade 5 at Marquette School is having a relay race. Each person on a 12-member team runs 50 m. How far does the relay team run?



Multiply
 0×12

$$\begin{array}{r} 12 \\ \times 50 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \times 50 \\ \hline 0 \end{array}$$

Multiply
 $5 \text{ tens} \times 12$

$$\begin{array}{r} 12 \\ \times 50 \\ \hline 600 \end{array}$$

$$\begin{array}{r} 12 \\ \times 50 \\ \hline 600 \end{array}$$

Each relay team runs 600 m.

EXERCISES

Multiply.

$$\begin{array}{r} 1. \quad 22 \\ \times 2 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 2. \quad 22 \\ \times 20 \\ \hline 440 \end{array}$$

$$\begin{array}{r} 3. \quad 24 \\ \times 20 \\ \hline 480 \end{array}$$

$$\begin{array}{r} 4. \quad 34 \\ \times 20 \\ \hline 680 \end{array}$$

$$\begin{array}{r} 5. \quad 43 \\ \times 20 \\ \hline 860 \end{array}$$

$$\begin{array}{r} 6. \quad 53 \\ \times 3 \\ \hline 159 \end{array}$$

$$\begin{array}{r} 7. \quad 53 \\ \times 30 \\ \hline 1590 \end{array}$$

$$\begin{array}{r} 8. \quad 52 \\ \times 30 \\ \hline 1560 \end{array}$$

$$\begin{array}{r} 9. \quad 62 \\ \times 30 \\ \hline 1860 \end{array}$$

$$\begin{array}{r} 10. \quad 71 \\ \times 30 \\ \hline 2130 \end{array}$$

$$\begin{array}{r} 11. \quad 44 \\ \times 6 \\ \hline 264 \end{array}$$

$$\begin{array}{r} 12. \quad 44 \\ \times 60 \\ \hline 2640 \end{array}$$

$$\begin{array}{r} 13. \quad 48 \\ \times 60 \\ \hline 2880 \end{array}$$

$$\begin{array}{r} 14. \quad 78 \\ \times 60 \\ \hline 4680 \end{array}$$

$$\begin{array}{r} 15. \quad 99 \\ \times 60 \\ \hline 5940 \end{array}$$

$$\begin{array}{r} 16. \quad 31 \\ \times 50 \\ \hline 1550 \end{array}$$

$$\begin{array}{r} 17. \quad 75 \\ \times 40 \\ \hline 3000 \end{array}$$

$$\begin{array}{r} 18. \quad 67 \\ \times 70 \\ \hline 4690 \end{array}$$

$$\begin{array}{r} 19. \quad 34 \\ \times 80 \\ \hline 2720 \end{array}$$

$$\begin{array}{r} 20. \quad 85 \\ \times 90 \\ \hline 7650 \end{array}$$

Using the Exercises

- The first two problems in the first three rows show the relationship when multiplying by 2 and 20, 3 and 30, and 6 and 60. This should again point up the zero that is written in the product.
- All problems should be done in the short form as shown in the lesson example.

Find the product

1. $\begin{array}{r} 11 \\ \times 50 \\ \hline 550 \end{array}$
2. $\begin{array}{r} 13 \\ \times 30 \\ \hline 390 \end{array}$
3. $\begin{array}{r} 24 \\ \times 20 \\ \hline 480 \end{array}$
4. $\begin{array}{r} 32 \\ \times 30 \\ \hline 960 \end{array}$
5. $\begin{array}{r} 43 \\ \times 10 \\ \hline 430 \end{array}$
6. $\begin{array}{r} 34 \\ \times 50 \\ \hline 1700 \end{array}$
7. $\begin{array}{r} 43 \\ \times 60 \\ \hline 2580 \end{array}$
8. $\begin{array}{r} 55 \\ \times 30 \\ \hline 1650 \end{array}$
9. $\begin{array}{r} 64 \\ \times 40 \\ \hline 2560 \end{array}$
10. $\begin{array}{r} 76 \\ \times 80 \\ \hline 6080 \end{array}$
11. $\begin{array}{r} 68 \\ \times 70 \\ \hline 4760 \end{array}$
12. $\begin{array}{r} 77 \\ \times 80 \\ \hline 6160 \end{array}$
13. $\begin{array}{r} 87 \\ \times 90 \\ \hline 7830 \end{array}$
14. $\begin{array}{r} 98 \\ \times 70 \\ \hline 6860 \end{array}$
15. $\begin{array}{r} 79 \\ \times 60 \\ \hline 4740 \end{array}$

Solve

16. Sam practises swimming in his backyard pool. The pool is 13 m long and Sam swims 20 lengths every day. How far does he swim each day? **260 m**
17. Mary jogs along her street. She goes past 30 houses. If each house lot is 37 m wide, how far does she jog as she goes by? **1110 m**
18. A race car travels at 75 metres per second. How far does it go in one minute? **4500 m**

Computer Tutor

The diagram shows three computer monitors displaying multiplication problems. Each monitor has an 'IN' table and an 'OUT' table.

- Monitor 1:** Multiplier $\times 80$. IN table: 89, 35, 46, 77, 67. OUT table: 7120, 2800, 3680, 6160, 5360.
- Monitor 2:** Multiplier $\times 20$. IN table: 12, 33, 40, 35, 62. OUT table: 240, 660, 800, 700, 1240.
- Monitor 3:** Multiplier $\times 50$. IN table: 8, 11, 27, 65, 79. OUT table: 400, 550, 1350, 3250, 3950.

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Extra Practice

Find the product.

1. $\begin{array}{r} 62 \\ \times 40 \\ \hline 2480 \end{array}$
2. $\begin{array}{r} 51 \\ \times 60 \\ \hline 3060 \end{array}$
3. $\begin{array}{r} 71 \\ \times 50 \\ \hline 3550 \end{array}$
4. $\begin{array}{r} 29 \\ \times 30 \\ \hline 870 \end{array}$
5. $\begin{array}{r} 81 \\ \times 70 \\ \hline 5670 \end{array}$
6. $\begin{array}{r} 85 \\ \times 80 \\ \hline 6800 \end{array}$
7. $\begin{array}{r} 68 \\ \times 70 \\ \hline 4760 \end{array}$
8. $\begin{array}{r} 79 \\ \times 90 \\ \hline 7110 \end{array}$
9. $\begin{array}{r} 55 \\ \times 50 \\ \hline 2750 \end{array}$
10. $\begin{array}{r} 39 \\ \times 40 \\ \hline 1560 \end{array}$

Solve.

11. Lisette jogs 98 m in a minute. How far will she jog in a half hour? **2940 m**
12. Water was dripping from a tap at a rate of 49 drops a minute. How many drops of water would be lost in an hour? **2940**

Worksheet A14

Pages 58-59

Assigning the Practice

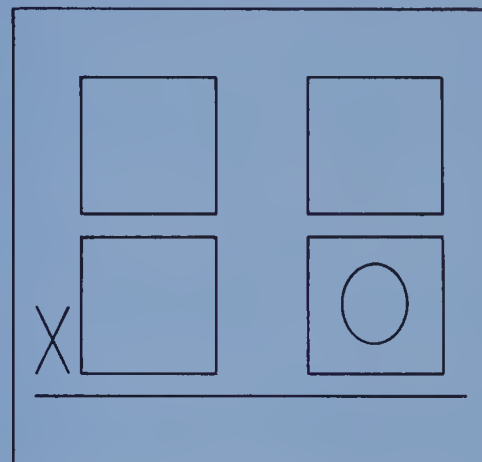
Minimum: 1-10, 16-17

Average: 4-18

Enriched: 4-18

Reinforcement

1. Play this multiplication game for two players. Make one game board for each player.



Prepare four numeral cards for each of the ten digits (0-9) for each player. Cards are turned upside down in a pile. Players, in turn, draw a card and place it over a blank square on the game board. When all three blank squares are covered, players find the product.

The player with the greatest (or least) product wins a point. The first player to get 10 points wins the game.

2. Provide practice with multiplications like the following to emphasize the zeros in the product patterns.

- a. 25×6 25×60
- b. 92×3 92×30
- c. 78×5 78×50
- d. 47×8 47×80

Enrichment

1. Assign *Computer Tutor* at the bottom of page 59. Interested students can devise other function tables for the rest of the class to solve.

2. Ask the students to complete the following metric table and note the zero patterns.

metres	centimetres	millimetres
29		
57		
86		
124		
389		

Objective A15

Multiply a two-digit multiplicand by a two-digit multiplier less than 20.

Introducing the Lesson

Discuss slalom racing in skiing. Point out that the racer passes through **gates** as he or she goes through a race course. A gate consists of a pair of poles with flags at the top.

Teaching the Lesson

Read and discuss the ski racing problem at the top of page 60. Draw a diagram of the race on the chalkboard to show why multiplication is necessary. Explain the place-value aspect of the required multiplication.

$$\begin{array}{|c|} \hline 26 \\ \times 15 \\ \hline \end{array} = \begin{array}{|c|} \hline 26 \\ \times 5 \\ \hline 130 \end{array} + \begin{array}{|c|} \hline 26 \\ \times 10 \\ \hline 260 \end{array} = 390$$

Since $15 = 10 + 5$, we first multiply 5×26 and then multiply 10×26 . Record the multiplication vertically.

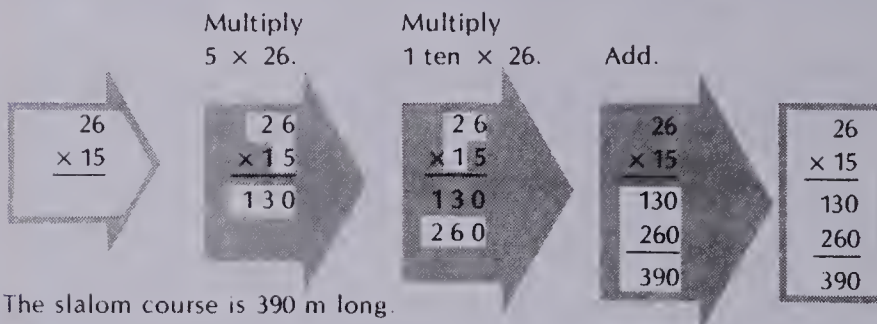
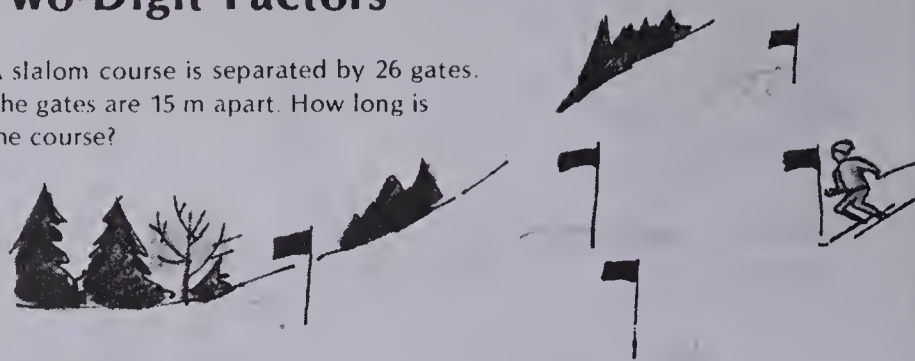
$$\begin{array}{r} 26 \\ \times 15 \\ \hline 130 \quad (5 \times 26) \\ 260 \quad (10 \times 26) \\ \hline 390 \end{array}$$

Have the students practise several other similar examples on graph paper to help them line up their numbers properly.

	4	8
×	1	4
1	9	2
4	8	0
6	7	2

Two-Digit Factors

A slalom course is separated by 26 gates. The gates are 15 m apart. How long is the course?



EXERCISES

Multiply.

- | | | | | |
|--|---|---|--|---|
| 1. $\begin{array}{r} 24 \\ \times 2 \\ \hline 48 \end{array}$ | 2. $\begin{array}{r} 24 \\ \times 10 \\ \hline 240 \end{array}$ | 3. $\begin{array}{r} 24 \\ \times 12 \\ \hline 288 \end{array}$ | 4. $\begin{array}{r} 35 \\ \times 4 \\ \hline 140 \end{array}$ | 5. $\begin{array}{r} 35 \\ \times 10 \\ \hline 350 \end{array}$ |
| 6. $\begin{array}{r} 35 \\ \times 14 \\ \hline 490 \end{array}$ | 7. $\begin{array}{r} 46 \\ \times 6 \\ \hline 276 \end{array}$ | 8. $\begin{array}{r} 46 \\ \times 10 \\ \hline 460 \end{array}$ | 9. $\begin{array}{r} 46 \\ \times 16 \\ \hline 736 \end{array}$ | 10. $\begin{array}{r} 77 \\ \times 8 \\ \hline 616 \end{array}$ |
| 11. $\begin{array}{r} 77 \\ \times 10 \\ \hline 770 \end{array}$ | 12. $\begin{array}{r} 77 \\ \times 18 \\ \hline 1386 \end{array}$ | 13. $\begin{array}{r} 63 \\ \times 9 \\ \hline 567 \end{array}$ | 14. $\begin{array}{r} 63 \\ \times 10 \\ \hline 630 \end{array}$ | 15. $\begin{array}{r} 63 \\ \times 19 \\ \hline 1197 \end{array}$ |
| 16. $\begin{array}{r} 27 \\ \times 13 \\ \hline 351 \end{array}$ | 17. $\begin{array}{r} 46 \\ \times 11 \\ \hline 506 \end{array}$ | 18. $\begin{array}{r} 64 \\ \times 17 \\ \hline 1088 \end{array}$ | 19. $\begin{array}{r} 53 \\ \times 18 \\ \hline 954 \end{array}$ | 20. $\begin{array}{r} 96 \\ \times 15 \\ \hline 1440 \end{array}$ |

Using the Exercises

- The problems in the first three rows are grouped in threes to develop multiplying first by the ones and then by the tens. The last row is a mixture.
- See that students align their numbers properly. Provide graph paper as needed.

PRACTICE

Find the product.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 12 \\ \times 11 \\ \hline 132 \end{array}$ | 2. $\begin{array}{r} 23 \\ \times 13 \\ \hline 299 \end{array}$ | 3. $\begin{array}{r} 43 \\ \times 12 \\ \hline 516 \end{array}$ | 4. $\begin{array}{r} 51 \\ \times 15 \\ \hline 765 \end{array}$ | 5. $\begin{array}{r} 82 \\ \times 14 \\ \hline 1148 \end{array}$ |
| 6. $\begin{array}{r} 45 \\ \times 12 \\ \hline 540 \end{array}$ | 7. $\begin{array}{r} 27 \\ \times 13 \\ \hline 351 \end{array}$ | 8. $\begin{array}{r} 35 \\ \times 14 \\ \hline 490 \end{array}$ | 9. $\begin{array}{r} 38 \\ \times 12 \\ \hline 456 \end{array}$ | 10. $\begin{array}{r} 29 \\ \times 13 \\ \hline 377 \end{array}$ |
| 11. $\begin{array}{r} 65 \\ \times 16 \\ \hline 1040 \end{array}$ | 12. $\begin{array}{r} 67 \\ \times 13 \\ \hline 871 \end{array}$ | 13. $\begin{array}{r} 54 \\ \times 14 \\ \hline 756 \end{array}$ | 14. $\begin{array}{r} 63 \\ \times 15 \\ \hline 945 \end{array}$ | 15. $\begin{array}{r} 46 \\ \times 16 \\ \hline 736 \end{array}$ |
| 16. $\begin{array}{r} 76 \\ \times 17 \\ \hline 1292 \end{array}$ | 17. $\begin{array}{r} 68 \\ \times 16 \\ \hline 1088 \end{array}$ | 18. $\begin{array}{r} 84 \\ \times 18 \\ \hline 1512 \end{array}$ | 19. $\begin{array}{r} 69 \\ \times 19 \\ \hline 1311 \end{array}$ | 20. $\begin{array}{r} 97 \\ \times 18 \\ \hline 1746 \end{array}$ |
| 21. $\begin{array}{r} 47 \\ \times 15 \\ \hline 705 \end{array}$ | 22. $\begin{array}{r} 75 \\ \times 16 \\ \hline 1200 \end{array}$ | 23. $\begin{array}{r} 98 \\ \times 18 \\ \hline 1764 \end{array}$ | 24. $\begin{array}{r} 56 \\ \times 16 \\ \hline 896 \end{array}$ | 25. $\begin{array}{r} 19 \\ \times 19 \\ \hline 361 \end{array}$ |

Solve.

26. A snack bar bought 12 cases of ginger ale. If each case had 24 cans, how many cans did they get? **288**
27. Mr. Fox needed to be back at work on Tuesday. He drove 88 kilometres per hour for 12 hours on Monday to get home. How far did he drive? **1056 km**

USING THE CALCULATOR

Use a calculator.

Do the parts inside the parentheses first.

- | | |
|--------------------------------------|--|
| a. $16 \times (35 + 22)$ 912 | b. $(16 \times 35) + (16 \times 22)$ 912 |
| c. $19 \times (72 + 13)$ 1615 | d. $(19 \times 72) + (19 \times 13)$ 1615 |
| e. $13 \times (50 + 44)$ 1222 | f. $(13 \times 50) + (13 \times 44)$ 1222 |
| g. $18 \times (66 + 11)$ 1386 | h. $(18 \times 66) + (18 \times 11)$ 1386 |

What do you notice about each pair? **Same**

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Assigning the Practice

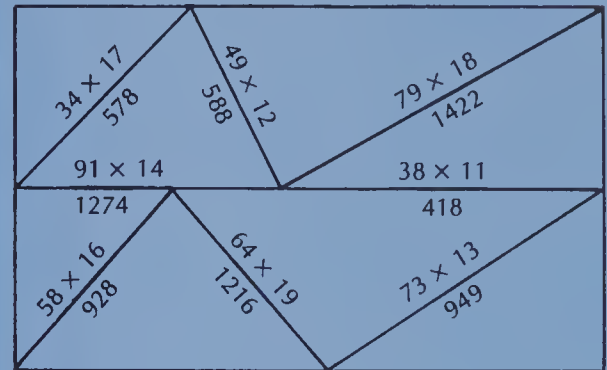
Minimum: 1-20, 26

Average: 6-27

Enriched: 6-27

Reinforcement

- Assign *Using the Calculator* at the bottom of page 61. All students should be able to find the pattern easily.
- Provide the following puzzle for the students to cut out the pieces, mix, and then arrange them as before.



Enrichment

- Ask students to write a rule about what they discovered in the *Using the Calculator* activity. If they have trouble describing in words what they discovered, tell them to use letters instead for the numbers. For example, $a \times (b + c) = (a \times b) + (a \times c)$
- Have the students complete the following equations.
 - $37 \times (20 + 5) = (37 \times \blacksquare) + (37 \times \blacksquare)$
 - $48 \times (70 + 2) = (\blacksquare \times 70) + (\blacksquare \times 2)$
 - $\blacksquare \times (\blacksquare + \blacksquare) = (95 \times 40) + (95 \times 2)$
 - $\blacksquare \times (\blacksquare + \blacksquare) = (67 \times 10) + (67 \times 3)$
 - $73 \times (80 + 1) = (\blacksquare \times \blacksquare) + (\blacksquare + \blacksquare)$

Extra Practice

Worksheet A15

Pages 60-61

Find the product.

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 35 \\ \times 12 \\ \hline 420 \end{array}$ | 2. $\begin{array}{r} 37 \\ \times 15 \\ \hline 555 \end{array}$ | 3. $\begin{array}{r} 26 \\ \times 19 \\ \hline 494 \end{array}$ | 4. $\begin{array}{r} 55 \\ \times 13 \\ \hline 715 \end{array}$ | 5. $\begin{array}{r} 28 \\ \times 12 \\ \hline 336 \end{array}$ |
| 6. $\begin{array}{r} 76 \\ \times 17 \\ \hline 1292 \end{array}$ | 7. $\begin{array}{r} 85 \\ \times 18 \\ \hline 1530 \end{array}$ | 8. $\begin{array}{r} 89 \\ \times 16 \\ \hline 1424 \end{array}$ | 9. $\begin{array}{r} 93 \\ \times 16 \\ \hline 1488 \end{array}$ | 10. $\begin{array}{r} 64 \\ \times 15 \\ \hline 960 \end{array}$ |

Solve.

11. Mrs. Turner bought 24 dozen rolls for a big picnic. How many rolls did she buy altogether? **288**
12. Mr. Carey's heart beats 79 times a minute. How many times will it beat in 12 min? **948**

Objective A16

Multiply a two-digit multiplicand by a two-digit multiplier.

Introducing the Lesson

Review rounding to the nearest ten with these examples.

- 17 rounds up to 20
- 12 rounds down to 10
- 15 rounds up to 20

Ask the students to round to the nearest ten as they estimate these products.

$$\begin{array}{r} 29 \rightarrow 30 \\ \times 14 \rightarrow \times 10 \\ \hline 300 \end{array} \qquad \begin{array}{r} 73 \rightarrow 70 \\ \times 18 \rightarrow \times 20 \\ \hline 1400 \end{array}$$

Try several similar examples.

Teaching the Lesson

Read and discuss the problem at the top of page 62. Explain that the speed and the time are known and that to find the distance travelled, one multiplies

$$\text{speed} \times \text{time} = \text{distance}.$$

Write the required multiplication on the chalkboard. Estimate the product.

$$\begin{array}{r} 92 \rightarrow 90 \\ \times 24 \rightarrow \times 20 \\ \hline 1800 \end{array}$$

Explain the place-value aspect of the multiplication for the exact product.

$$\begin{array}{r} 92 \\ \times 24 \\ \hline 368 \quad (4 \times 92) \\ 1840 \quad (20 \times 92) \\ \hline 2208 \end{array}$$

Point out how the estimate is close to the exact product.

Have the students practise several other similar examples on graph paper to help ensure proper number alignment.

Two-Digit Factors

A car was entered in the 24 h Le Mans endurance road race. It averaged 92 kilometres per hour in the race. How far did it go?

Multiply

$$4 \times 92.$$

Multiply

$$20 \times 92.$$

Add.

$$\begin{array}{r} 92 \\ \times 24 \\ \hline 368 \\ 1840 \\ \hline 2208 \end{array}$$

The car went 2208 km.
Is 2208 km a reasonable answer?

Estimate:

$$\begin{array}{r} 92 \\ \times 24 \\ \hline \end{array}$$

Round the factors.

$$\begin{array}{r} 90 \\ \times 20 \\ \hline \end{array}$$

Multiply.

$$\begin{array}{r} 90 \\ \times 20 \\ \hline 1800 \end{array}$$

2208 and 1800 are close. The answer is reasonable.

EXERCISES				
Multiply.				
1. $\begin{array}{r} 32 \\ \times 3 \\ \hline 96 \end{array}$	2. $\begin{array}{r} 32 \\ \times 20 \\ \hline 640 \end{array}$	3. $\begin{array}{r} 32 \\ \times 23 \\ \hline 736 \end{array}$	4. $\begin{array}{r} 26 \\ \times 4 \\ \hline 104 \end{array}$	5. $\begin{array}{r} 26 \\ \times 50 \\ \hline 1300 \end{array}$
6. $\begin{array}{r} 26 \\ \times 54 \\ \hline 1404 \end{array}$	7. $\begin{array}{r} 64 \\ \times 6 \\ \hline 384 \end{array}$	8. $\begin{array}{r} 64 \\ \times 40 \\ \hline 2560 \end{array}$	9. $\begin{array}{r} 64 \\ \times 46 \\ \hline 2944 \end{array}$	10. $\begin{array}{r} 38 \\ \times 5 \\ \hline 190 \end{array}$
11. $\begin{array}{r} 38 \\ \times 70 \\ \hline 2660 \end{array}$	12. $\begin{array}{r} 38 \\ \times 75 \\ \hline 2850 \end{array}$	13. $\begin{array}{r} 78 \\ \times 9 \\ \hline 702 \end{array}$	14. $\begin{array}{r} 78 \\ \times 80 \\ \hline 6240 \end{array}$	15. $\begin{array}{r} 78 \\ \times 89 \\ \hline 6942 \end{array}$
16. $\begin{array}{r} 25 \\ \times 34 \\ \hline 850 \end{array}$	17. $\begin{array}{r} 46 \\ \times 23 \\ \hline 1058 \end{array}$	18. $\begin{array}{r} 51 \\ \times 52 \\ \hline 2652 \end{array}$	19. $\begin{array}{r} 74 \\ \times 67 \\ \hline 4958 \end{array}$	20. $\begin{array}{r} 96 \\ \times 83 \\ \hline 7968 \end{array}$

Using the Exercises

- The problems in the first three rows are grouped in threes to develop the place-value aspect of multiplication. The last row of problems provide mixed practice.
- Provide graph paper, as needed, for these problems to aid the students with number alignment.

PRACTICE

Find the product. Show that each product is reasonable.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 24 \\ \times 21 \\ \hline 504 \end{array}$ | 2. $\begin{array}{r} 23 \\ \times 32 \\ \hline 736 \end{array}$ | 3. $\begin{array}{r} 34 \\ \times 22 \\ \hline 748 \end{array}$ | 4. $\begin{array}{r} 52 \\ \times 34 \\ \hline 1768 \end{array}$ | 5. $\begin{array}{r} 63 \\ \times 33 \\ \hline 2079 \end{array}$ |
| 6. $\begin{array}{r} 35 \\ \times 42 \\ \hline 1470 \end{array}$ | 7. $\begin{array}{r} 56 \\ \times 45 \\ \hline 2520 \end{array}$ | 8. $\begin{array}{r} 67 \\ \times 53 \\ \hline 3551 \end{array}$ | 9. $\begin{array}{r} 55 \\ \times 35 \\ \hline 1925 \end{array}$ | 10. $\begin{array}{r} 68 \\ \times 52 \\ \hline 3536 \end{array}$ |
| 11. $\begin{array}{r} 45 \\ \times 65 \\ \hline 2925 \end{array}$ | 12. $\begin{array}{r} 56 \\ \times 74 \\ \hline 4144 \end{array}$ | 13. $\begin{array}{r} 63 \\ \times 59 \\ \hline 3717 \end{array}$ | 14. $\begin{array}{r} 37 \\ \times 77 \\ \hline 2849 \end{array}$ | 15. $\begin{array}{r} 54 \\ \times 56 \\ \hline 3024 \end{array}$ |
| 16. $\begin{array}{r} 67 \\ \times 98 \\ \hline 6566 \end{array}$ | 17. $\begin{array}{r} 84 \\ \times 87 \\ \hline 7308 \end{array}$ | 18. $\begin{array}{r} 78 \\ \times 96 \\ \hline 7488 \end{array}$ | 19. $\begin{array}{r} 93 \\ \times 88 \\ \hline 8184 \end{array}$ | 20. $\begin{array}{r} 86 \\ \times 97 \\ \hline 8342 \end{array}$ |

Estimate the answer. Solve.

21. Bill's Garage buys motor oil in 24-can cases. If he buys 75 cases, how many cans does he get? **1800**
22. In one minute, 28 L of water pour out of the bathtub tap. How much water will be wasted in 15 min, if the tub is not plugged? **420 L**
23. Helene goes to school for 32 h every week. How many hours does she attend school in 36 weeks? **1152 h**

Using Your Head

Multiply the factors in any order. Look for products that are multiples of 10 or 100 first. Then multiply the third factor.

- | | |
|--|--|
| a. $32 \times 2 \times 50$ 3200 | b. $56 \times 45 \times 2$ 5040 |
| c. $4 \times 43 \times 25$ 4300 | d. $8 \times 83 \times 25$ 16600 |
| e. $15 \times 72 \times 2$ 2160 | f. $50 \times 12 \times 64$ 38400 |
| g. $20 \times 5 \times 14$ 1400 | h. $10 \times 37 \times 20$ 7400 |

63

Assigning the Practice

Minimum: 1-15, 21

Average: 1-15, 21-23

Enriched: 6-23

Reinforcement

1. Ask the students to complete the following cross-number multiplication puzzles.

×		
7	9	
5	6	

×		
8	4	
3	9	

×		
2	8	
7	5	

×		
4	9	
8	7	

2. Have the students round each factor to the nearest ten and write the estimated product.

a. $\begin{array}{r} 35 \\ \times 17 \\ \hline \end{array}$ b. $\begin{array}{r} 89 \\ \times 44 \\ \hline \end{array}$ c. $\begin{array}{r} 27 \\ \times 55 \\ \hline \end{array}$

d. $\begin{array}{r} 73 \\ \times 14 \\ \hline \end{array}$ e. $\begin{array}{r} 58 \\ \times 32 \\ \hline \end{array}$ f. $\begin{array}{r} 61 \\ \times 22 \\ \hline \end{array}$

Enrichment

1. Assign *Using your Head* at the bottom of page 63. Students should recall that a change in the order of the addends does not affect the sum. They should discover that changing the order of factors does not affect the product.

2. Ask each student to take his/her pulse. Direct them to count how many times their hearts beat in 15 s. Then ask them to calculate their number of beats for one minute, one hour, one day, and one year. Display the results.

Extra Practice

Find the product.

- | | | | | |
|--|--|--|--|---|
| 1. $\begin{array}{r} 36 \\ \times 22 \\ \hline 792 \end{array}$ | 2. $\begin{array}{r} 25 \\ \times 35 \\ \hline 875 \end{array}$ | 3. $\begin{array}{r} 26 \\ \times 54 \\ \hline 1404 \end{array}$ | 4. $\begin{array}{r} 37 \\ \times 64 \\ \hline 2368 \end{array}$ | 5. $\begin{array}{r} 48 \\ \times 56 \\ \hline 2688 \end{array}$ |
| 6. $\begin{array}{r} 75 \\ \times 68 \\ \hline 5100 \end{array}$ | 7. $\begin{array}{r} 83 \\ \times 94 \\ \hline 7802 \end{array}$ | 8. $\begin{array}{r} 79 \\ \times 87 \\ \hline 6873 \end{array}$ | 9. $\begin{array}{r} 82 \\ \times 85 \\ \hline 6970 \end{array}$ | 10. $\begin{array}{r} 96 \\ \times 59 \\ \hline 5664 \end{array}$ |

Solve.

11. How many hours are there in a month with 31 days? **744 h**
12. Henry can type 67 words per minute. How many words does he type in 35 min? **2345**

Worksheet A16

Pages 62-63

Objective M1

Multiply money.

Introducing the Lesson

Review the use of ¢ and \$ in writing amounts of money. Show the students how 9¢ can be written as 9 hundredths of a dollar or \$0.09. Ask the students to write the following using the dollar sign: 7¢, 5¢, 1¢, 15¢, 75¢, 95¢, 145¢.

Point out how the ones place corresponds to the number of dollars, the tenths place corresponds to the number of dimes, and the hundredths place corresponds to the number of pennies.

Teaching the Lesson

Read and discuss the problems at the top of page 64. Write each on the chalkboard and discuss the steps necessary to find the product. Stress the placement of the decimal point in the product.

$$\begin{array}{r} \$0.09 \\ \times 4 \\ \hline \end{array}$$

Two decimal places are in the factors.

$$\begin{array}{r} \$0.36 \\ \times 4 \\ \hline \end{array}$$

Thus, two decimal places are in the product.

Point out also the necessity for writing the dollar sign (or cents sign) with the product to indicate that it is money.

Have the students name sports items and approximate their costs. List these on the chalkboard. Use these prices for an imaginary classroom store. Have the students place orders from this store and then compute the costs of the orders.

Multiplying with Money

What is the cost of 4 ribbons at 9¢ each?



$$\begin{array}{r} 9¢ \\ \times 4 \\ \hline 36¢ \end{array} \quad \text{or} \quad \begin{array}{r} \$0.09 \\ \times 4 \\ \hline \$0.36 \end{array}$$

What is the cost of 3 pairs of track shoes at \$21.45 a pair?



$$\begin{array}{r} \$21.45 \\ \times 3 \\ \hline \$64.35 \end{array}$$

EXERCISES

Multiply.

- | | | | | |
|---|---|---|---|--|
| 1. $\begin{array}{r} 8¢ \\ \times 6 \\ \hline 48¢ \end{array}$ | 2. $\begin{array}{r} \$0.08 \\ \times 6 \\ \hline \$0.48 \end{array}$ | 3. $\begin{array}{r} 7¢ \\ \times 9 \\ \hline 63¢ \end{array}$ | 4. $\begin{array}{r} \$0.07 \\ \times 9 \\ \hline \$0.63 \end{array}$ | 5. $\begin{array}{r} \$0.70 \\ \times 9 \\ \hline \$6.30 \end{array}$ |
| 6. $\begin{array}{r} 15¢ \\ \times 6 \\ \hline 90¢ \end{array}$ | 7. $\begin{array}{r} \$0.15 \\ \times 6 \\ \hline \$0.90 \end{array}$ | 8. $\begin{array}{r} \$1.50 \\ \times 6 \\ \hline \$9.00 \end{array}$ | 9. $\begin{array}{r} \$10.50 \\ \times 6 \\ \hline \$63.00 \end{array}$ | 10. $\begin{array}{r} \$15.67 \\ \times 4 \\ \hline \$62.68 \end{array}$ |
| 11. $\begin{array}{r} \$5.30 \\ \times 4 \\ \hline \$21.20 \end{array}$ | 12. $\begin{array}{r} \$50.30 \\ \times 4 \\ \hline \$201.20 \end{array}$ | 13. $\begin{array}{r} \$9.70 \\ \times 6 \\ \hline \$58.20 \end{array}$ | 14. $\begin{array}{r} \$64.28 \\ \times 3 \\ \hline \$192.84 \end{array}$ | 15. $\begin{array}{r} \$27.34 \\ \times 2 \\ \hline \$54.68 \end{array}$ |
| 16. $\begin{array}{r} 53¢ \\ \times 24 \\ \hline 1272¢ \end{array}$ | 17. $\begin{array}{r} \$0.53 \\ \times 24 \\ \hline \$12.72 \end{array}$ | 18. $\begin{array}{r} 97¢ \\ \times 46 \\ \hline 4462¢ \end{array}$ | 19. $\begin{array}{r} \$0.97 \\ \times 46 \\ \hline \$44.62 \end{array}$ | 20. $\begin{array}{r} \$0.70 \\ \times 46 \\ \hline \$32.20 \end{array}$ |

Using the Exercises

- Questions 1 to 20 developmentally treat the two ways to write money and the multiplication of money. Check that students label the products with either a dollar or a cents sign. See that the decimal points are properly placed. Questions 2, 4, and 7 also must have a zero in the dollars place.

PRACTICE

Find the product. Check that each product is reasonable.

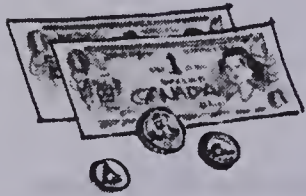
1. $26¢ \times 9 = 234¢$
2. $\$0.76 \times 8 = \6.08
3. $\$3.35 \times 8 = \26.80
4. $\$7.36 \times 2 = \14.72
5. $\$8.37 \times 5 = \41.85
6. $\$3.75 \times 9 = \33.75
7. $\$6.99 \times 5 = \34.95
8. $\$2.79 \times 6 = \16.74
9. $\$49.95 \times 7 = \349.65
10. $\$12.35 \times 8 = \98.80
11. $\$15.35 \times 4 = \61.40
12. $\$17.95 \times 6 = \107.70
13. $\$5.37 \times 6 = \32.22
14. $\$17.77 \times 6 = \106.62
15. $\$0.50 \times 48 = \24.00

Estimate the answer. Solve.

16. What is the cost of 3 pairs of athletic socks at \$1.75 a pair? $\$5.25$
17. What is the cost of 6 pairs of running shoes at \$24.75 a pair? $\$148.50$
18. Which costs more: 4 stop watches at \$13.75 each, or 80 ribbons at 75¢ each? **80 ribbons (\$60)**
19. A customer bought 6 pairs of socks at \$1.75 a pair and 2 pairs of shorts at \$4.95 a pair. What is his change from \$20.00? $\$20.40$
He owes 40¢ more

Equal Shares

How many ways can \$2.40 be shared equally? Copy and complete this chart. Can you find 18 possibilities?



Number of People	Money for each Person	Total Amount of Money
4	$\times 60¢$	$= \$2.40$
2	$\times \$1.20$	$= \$2.40$
3	$\times 80¢$	$= \$2.40$
6	$\times 40¢$	$= \$2.40$
12	$\times 20¢$	$= \$2.40$
24	$\times 10¢$	$= \$2.40$
1	$\times \$2.40$	$= \$2.40$
15	$\times 16¢$	$= \$2.40$
16	$\times 15¢$	
20	$\times 12¢$	

65

Assigning the Practice

Minimum: 1-10, 16-17

Average: 1-19

Enriched: 1-19

Reinforcement

1. Ask students to find the total cost of items given out at the school track meet:
 - 35 school shirts at \$3.75 each
 - 75 ribbons at 37¢ each
 - 12 medals at \$5.76 each
 - 5 trophies at \$19.75 each
 - 4 stop watches at \$16.17 each

2. Using a sports store catalog, ask the students to find the cost of equipment and clothing for one football team or one hockey team. Have them write the multiplications and additions on paper and then glue pictures of the items near the calculations. Display the results.

Enrichment

1. Assign *Equal Shares* at the bottom of page 65.
2. Have the students solve the following problem.

John has less than \$5.00 in dimes. He can place them evenly into 2 stacks, 3 stacks, or 4 stacks. How much money might he have? (There are several correct answers.)

Extra Practice

Multiply.

1. $49¢ \times 5 = 245¢$
2. $\$0.49 \times 5 = \2.45
3. $\$0.53 \times 6 = \3.18
4. $\$0.73 \times 9 = \6.57
5. $\$4.32 \times 3 = \12.96
6. $\$4.32 \times 9 = \38.88
7. $\$5.34 \times 12 = \64.08
8. $\$5.34 \times 17 = \90.78
9. $\$17.32 \times 4 = \69.28
10. $\$17.32 \times 42 = \727.44
11. $\$57.62 \times 49 = \2823.38
12. $\$76.22 \times 53 = \4039.66

Solve.

13. What does it cost to feed 35 members of the track team, if lunch costs \$2.65 each? $\$92.75$

Worksheet M1

Pages 64-65

Problem Solving Activities

Assign Level 5, Unit 3.

Objective A17

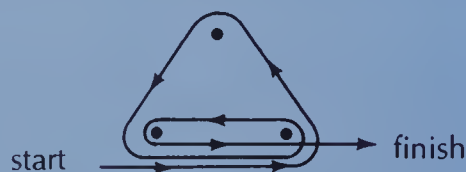
Multiply a decimal in tenths by a one- or two-digit multiplier.

Introducing the Lesson

Discuss sailboat racing. Have the students relate their experiences. Point out that the boats round marks (or buoys) in the water during the race and that the distance between two of these marks is called a leg.

Teaching the Lesson

Read and discuss the problem at the top of page 66. Draw a diagram of the problem on the chalkboard.



Show how the length of the race can be found by adding 1.5 six times.

$$1.5 + 1.5 + 1.5 + 1.5 + 1.5 + 1.5 = 9.0 \text{ km}$$

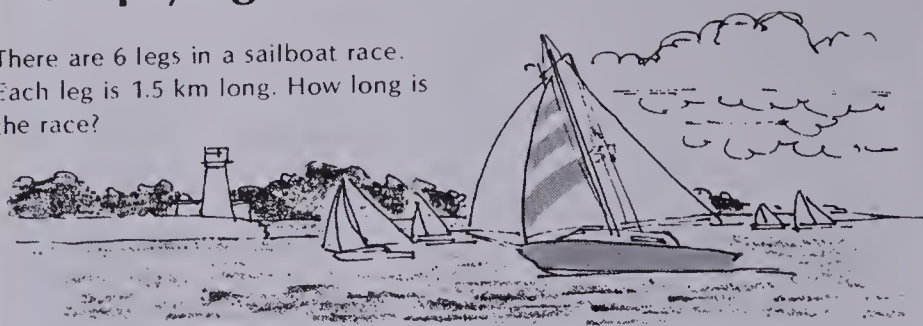
Explain that multiplication is faster. Write the problem on the chalkboard and point out that one normally multiplies first and then places the decimal point in the product.

$$\begin{array}{r} 3 \\ 1.5 \\ \times 6 \\ \hline 9.0 \end{array} \quad \begin{array}{l} \text{One decimal place is in the} \\ \text{factors.} \\ \text{Thus, one decimal place is} \\ \text{in the product.} \end{array}$$

Provide practice with several other similar problems. Let some students come to the chalkboard so you can observe and discuss their work.

Multiplying with Tenths

There are 6 legs in a sailboat race. Each leg is 1.5 km long. How long is the race?



Multiply
 $6 \times 15 \text{ tenths}$.

Write the
decimal point.

$$\begin{array}{r} 1.5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 1.5 \\ \times 6 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 1.5 \\ \times 6 \\ \hline 9.0 \end{array}$$

90 tenths

The race is 9.0 km long.

EXERCISES

Multiply.

1. $\begin{array}{r} 4.2 \\ \times 3 \\ \hline 12.6 \end{array}$	2. $\begin{array}{r} 5.4 \\ \times 2 \\ \hline 10.8 \end{array}$	3. $\begin{array}{r} 6.7 \\ \times 8 \\ \hline 53.6 \end{array}$	4. $\begin{array}{r} 29.4 \\ \times 5 \\ \hline 147.0 \end{array}$	5. $\begin{array}{r} 36.7 \\ \times 6 \\ \hline 220.2 \end{array}$
6. $\begin{array}{r} 11.2 \\ \times 4 \\ \hline 44.8 \end{array}$	7. $\begin{array}{r} 90.3 \\ \times 3 \\ \hline 270.9 \end{array}$	8. $\begin{array}{r} 28.4 \\ \times 7 \\ \hline 198.8 \end{array}$	9. $\begin{array}{r} 71.2 \\ \times 9 \\ \hline 640.8 \end{array}$	10. $\begin{array}{r} 37.9 \\ \times 8 \\ \hline 303.2 \end{array}$
11. $\begin{array}{r} 4.2 \\ \times 33 \\ \hline 138.6 \end{array}$	12. $\begin{array}{r} 5.1 \\ \times 24 \\ \hline 122.4 \end{array}$	13. $\begin{array}{r} 4.6 \\ \times 53 \\ \hline 243.8 \end{array}$	14. $\begin{array}{r} 7.8 \\ \times 65 \\ \hline 507.0 \end{array}$	15. $\begin{array}{r} 5.9 \\ \times 86 \\ \hline 507.4 \end{array}$
16. $\begin{array}{r} 70.2 \\ \times 5 \\ \hline 351.0 \end{array}$	17. $\begin{array}{r} 134.1 \\ \times 6 \\ \hline 804.6 \end{array}$	18. $\begin{array}{r} 8.7 \\ \times 8 \\ \hline 69.6 \end{array}$	19. $\begin{array}{r} 520.7 \\ \times 4 \\ \hline 2082.8 \end{array}$	20. $\begin{array}{r} 200.9 \\ \times 5 \\ \hline 1004.5 \end{array}$

Using the Exercises

- Questions 1 to 20 provide a developmental sequence of the multiplying-with-tenths concept. Check that students place the decimal properly in each product.
- Questions 11 to 15 involve two partial products. Watch for proper number alignment.
- Questions 7, 16, 19, and 20 involve zeros in the multiplicand.

PRACTICE

Find the product. Check that each product is reasonable.

1. $1.2 \times 3 = 3.6$
2. $3.6 \times 2 = 7.2$
3. $23.4 \times 4 = 93.6$
4. $36.4 \times 5 = 182.0$
5. $21.5 \times 6 = 129.0$
6. $3.4 \times 2 = 6.8$
7. $5.7 \times 3 = 17.1$
8. $2.2 \times 5 = 11.0$
9. $15.6 \times 7 = 109.2$
10. $76.4 \times 9 = 687.6$
11. $53.7 \times 2 = 107.4$
12. $75.3 \times 2 = 150.6$
13. $63.9 \times 4 = 255.6$
14. $56.5 \times 6 = 339.0$
15. $47.4 \times 8 = 379.2$
16. $7.5 \times 23 = 172.5$
17. $8.6 \times 37 = 318.2$
18. $6.7 \times 85 = 569.5$
19. $7.8 \times 69 = 538.2$
20. $8.9 \times 94 = 836.6$

Estimate the answer. Solve.

21. Sean's father needs fuel for the lawn mower. He buys 4 L of gas. One litre costs 44.8¢. How much does he pay for the gas? **\$1.392**
22. While hovering near a flower, a humming bird's wings beat about 48 times a second. At that rate, how many beats would its wings make in 3.5 seconds? **168**

Bill Checking

Mr. Wyler checks his gasoline credit card bill each month. One month he thought he should pay \$69.78. The bill stated he owed \$70.78. Check Mr. Wyler's bill:

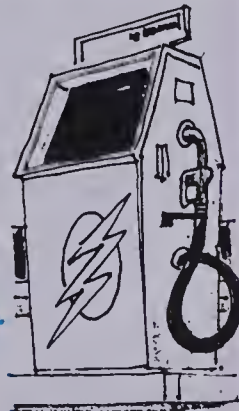
Date	Amount	Price of one litre	Cost
Sept. 27	65 L	36 6¢	\$23 79
Oct. 13	62 L	37 5¢	23 25
Oct. 24	60 L	37 9¢	23 74
Total due			\$70.78

22.74

69.78

Who was right?

Mr. Wyler



67

Assigning the Practice

Minimum: 1-10, 16-21

Average: 1-10, 16-22

Enriched: 6-22

Reinforcement

1. Provide the following multiplication table for the students to complete.

\times	10	12	14	16	18	20
1						
1.5						
2						
2.5						
3						
3.5						
4						
4.5						

After completion, discuss the patterns that were found.

2. Ask the students to round these to the nearest whole number and write an estimated product.

a. 27.2×8

b. 195.6×2

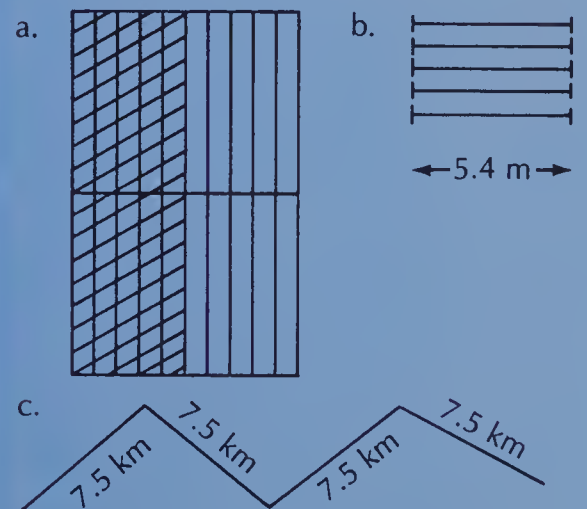
c. 46.5×30

d. 273.3×4

Enrichment

1. Assign *Bill Checking* at the bottom of page 67. Discuss the importance of checking bills as they are received. Explain the information given in the chart. Students can find the error on their own and check their work with a calculator.

2. Ask the students to write a multiplication for each drawing or diagram.



Extra Practice

Find the product.

1. $24.6 \times 3 = 73.8$
2. $35.1 \times 4 = 140.4$
3. $63.2 \times 8 = 505.6$
4. $49.7 \times 5 = 248.5$
5. $51.8 \times 7 = 362.6$
6. $6.3 \times 37 = 233.1$
7. $3.7 \times 21 = 77.7$
8. $5.6 \times 42 = 235.2$
9. $3.9 \times 85 = 331.5$
10. $4.1 \times 97 = 397.7$

Solve.

11. It takes 8.6 min to make a toy on an assembly line. How long does it take to make 48 toys? **412.8 min**
12. If electricity costs 3.9¢ per kilowatt hour, how much should you pay for using 50 kilowatt hours? **\$1.95**

Worksheet A17

Pages 66-67

UNIT 3 LESSON 10

Objective M2

Estimate and read temperature in degrees Celsius.

Introducing the Lesson

Prepare on chart paper a large thermometer for classroom display. Cut pictures out of magazines (or draw) the following scenes:

- a boiling tea kettle
- ice
- hot summer day
- people sitting comfortably indoors
- cold winter day.

Show the above scenes, discuss the temperatures shown in them, and ask the students to arrange them in order from hottest to coldest.

Teaching the Lesson

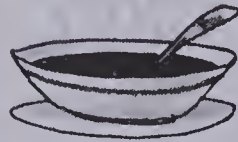
Divide the class into small groups. Provide each group with a thermometer. Ask the students to locate 0°C and 100°C on the thermometer. Point out how each temperature is recorded: 0°C and 100°C . Explain also how to find 57°C , 78°C , 15°C , and 42°C on the thermometer. Ask each group to measure the temperature of a glass of ice water, of a glass of room-temperature water, of a cup of hot coffee or tea. The groups should then record the three temperatures they measured.

Discuss the findings of each group and locate them on the large classroom thermometer.

Read and discuss the information at the top of page 68. Have the students approximate the temperatures of the scenes in the magazine pictures used earlier in the lesson.

Temperature

Temperature is measured in degrees Celsius.

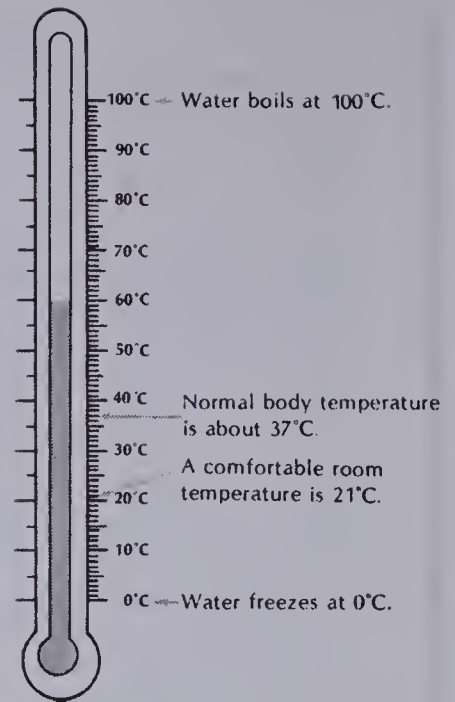


hot soup
about 70°C

baby's bath
about 35°C



summer day
about 27°C



EXERCISES

Write a, b, or c for the most likely measure.

- Comfortable room temperature
C (a) 36°C (b) 30°C (c) 21°C
- Good skiing day
b (a) 15°C (b) 0°C (c) 10°C
- Good weather for swimming
b (a) 18°C (b) 28°C (c) 8°C
- Cup of hot chocolate
C (a) 100°C (b) 5°C (c) 65°C
- Comfortable bath water
b (a) 15°C (b) 40°C (c) 75°C
- Temperature needed to make ice cubes
C (a) 30°C (b) 10°C (c) 0°C

Using the Exercises

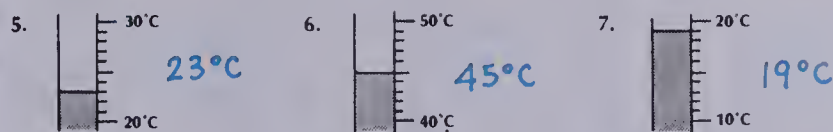
- Questions 1 to 6 allow the students to apply the results of the lesson's experiments and discussion to a measurement mark on the thermometer. Each question correctly answered should provide a good reference point for estimating and measuring other temperatures.

PRACTICE

Copy and complete.

- Water freezes at 0°C .
- Water boils at 100°C .
- Normal body temperature is 37°C .
- Usual room temperature is 21°C .

Write the temperature.



Choose the most likely temperature.

- A hot summer day
 60°C 32°C 22°C
- A nice autumn day
 13°C 3°C 30°C
- A person's fever
 21°C 37°C 39°C
- A cup of hot tea
 35°C 70°C 20°C

REVIEW

Multiply.

A14	1. 23×30 690	2. 65×40 2600	3. 52×60 3120	4. 74×70 5180
A15	5. 42×13 546	6. 73×12 876	7. 64×15 960	8. 76×19 1444
A16	9. 31×23 713	10. 53×46 2438	11. 86×43 3698	12. 54×85 4590
M1	13. $\$0.07 \times 5$ $\$0.35$	14. $\$3.42 \times 2$ $\$6.84$	15. $\$15.25 \times 4$ $\$61.00$	16. $\$6.50 \times 32$ $\$208.00$
A17	17. 9.3×4 37.2	18. 73.5×7 514.5	19. 3.9×8 31.2	20. 5.2×16 83.2

69

Assigning the Practice

Minimum: 1-11

Average: 1-11

Enriched: 1-11

Review Exercises

Questions	Objective	Pages
1-4	A14	58-59
5-8	A15	60-61
9-12	A16	62-63
13-16	M1	64-65
17-20	A17	66-67

Reinforcement

1. Provide the students with a worksheet of blank thermometers. Ask them to measure the temperature in the following places and indicate their findings on the blank thermometers.

- outside in the sun
- in the basement
- near the ceiling of a room
- near the floor of a room
- in a refrigerator

2. Have the students make posters depicting common temperatures. Display them in the classroom or school halls.

Enrichment

1. Ask the students to research the average January and July temperatures of Halifax, Winnipeg, and Vancouver. A line graph can be prepared from the information found.

2. Have the students keep a chart of the daily high and low temperatures for two weeks.

Extra Practice

Worksheet M2

Pages 68-69

Match.

- Normal body temperature 37°C A. 70°C
- Water boils 100°C B. 35°C
- Hot tea 70°C C. 37°C
- Water freezes 0°C D. 0°C
- Mild bath water 35°C E. 100°C
- Room temperature 21°C F. 21°C
- Hot summer day 30°C G. 5°C
- Chilly fall day 5°C H. 30°C
- Jeanette's temperature was 38.5°C . Then it went down 0.6°C . What was her temperature then? 27.9°C

Unit 3 Objective	Test Question	Pages
A10	1, 2	50-51
A11	3-5	52-53
A12	6, 8	54-55
A13	7, 9, 10	56-57
A14	11-13	58-59
A15	14-16	60-61
A16	17-20	62-63
M1	21-25	64-65
A17	26-30	66-67
M2	31	68-69
PS	32-34	

TEST

UNIT 3

Multiply.

1. $\begin{array}{r} 70 \\ \times 4 \\ \hline 280 \end{array}$
2. $\begin{array}{r} 90 \\ \times 6 \\ \hline 540 \end{array}$
3. $\begin{array}{r} 81 \\ \times 9 \\ \hline 729 \end{array}$
4. $\begin{array}{r} 54 \\ \times 5 \\ \hline 270 \end{array}$
5. $\begin{array}{r} 98 \\ \times 7 \\ \hline 686 \end{array}$
6. $\begin{array}{r} 500 \\ \times 2 \\ \hline 1000 \end{array}$
7. $\begin{array}{r} 409 \\ \times 3 \\ \hline 1227 \end{array}$
8. $\begin{array}{r} 9000 \\ \times 9 \\ \hline 81\,000 \end{array}$
9. $\begin{array}{r} 2956 \\ \times 7 \\ \hline 20\,692 \end{array}$
10. $\begin{array}{r} 6078 \\ \times 5 \\ \hline 30\,390 \end{array}$
11. $\begin{array}{r} 34 \\ \times 20 \\ \hline 680 \end{array}$
12. $\begin{array}{r} 75 \\ \times 40 \\ \hline 3000 \end{array}$
13. $\begin{array}{r} 86 \\ \times 50 \\ \hline 4300 \end{array}$
14. $\begin{array}{r} 23 \\ \times 12 \\ \hline 276 \end{array}$
15. $\begin{array}{r} 48 \\ \times 15 \\ \hline 720 \end{array}$
16. $\begin{array}{r} 75 \\ \times 18 \\ \hline 1350 \end{array}$
17. $\begin{array}{r} 36 \\ \times 41 \\ \hline 1476 \end{array}$
18. $\begin{array}{r} 25 \\ \times 32 \\ \hline 800 \end{array}$
19. $\begin{array}{r} 67 \\ \times 58 \\ \hline 3886 \end{array}$
20. $\begin{array}{r} 89 \\ \times 95 \\ \hline 8455 \end{array}$
21. $\begin{array}{r} 52¢ \\ \times 7 \\ \hline 364¢ \end{array}$
22. $\begin{array}{r} \$4.29 \\ \times 5 \\ \hline \$21.45 \end{array}$
23. $\begin{array}{r} \$14.98 \\ \times 6 \\ \hline \$89.88 \end{array}$
24. $\begin{array}{r} \$6.25 \\ \times 5 \\ \hline \$31.25 \end{array}$
25. $\begin{array}{r} \$70.55 \\ \times 4 \\ \hline \$282.20 \end{array}$
26. $\begin{array}{r} 3.4 \\ \times 2 \\ \hline 6.8 \end{array}$
27. $\begin{array}{r} 8.7 \\ \times 9 \\ \hline 78.3 \end{array}$
28. $\begin{array}{r} 5.6 \\ \times 4 \\ \hline 22.4 \end{array}$
29. $\begin{array}{r} 3.7 \\ \times 82 \\ \hline 303.4 \end{array}$
30. $\begin{array}{r} 5.9 \\ \times 96 \\ \hline 566.4 \end{array}$

Solve.

31. What is the temperature when it is 15°C above the freezing point of water? **15°C**
32. A doublechair ski lift carries 710 people to the top of the mountain every hour. How many people does it carry up in 7 h? **4970**
33. What is the cost of 8 tickets at \$9.50 per ticket? **\$76**
34. A jet can go 845 kilometres per hour. How far can it go in 6 h? **5070 km**

70

Post-test

Unit 3

Multiply.

1. $\begin{array}{r} 80 \\ \times 4 \\ \hline 320 \end{array}$
2. $\begin{array}{r} 70 \\ \times 3 \\ \hline 210 \end{array}$
3. $\begin{array}{r} 52 \\ \times 6 \\ \hline 312 \end{array}$
4. $\begin{array}{r} 73 \\ \times 8 \\ \hline 584 \end{array}$
5. $\begin{array}{r} 49 \\ \times 5 \\ \hline 245 \end{array}$
6. $\begin{array}{r} 400 \\ \times 6 \\ \hline 2400 \end{array}$
7. $\begin{array}{r} 306 \\ \times 8 \\ \hline 2448 \end{array}$
8. $\begin{array}{r} 5000 \\ \times 6 \\ \hline 30\,000 \end{array}$
9. $\begin{array}{r} 2467 \\ \times 2 \\ \hline 4934 \end{array}$
10. $\begin{array}{r} 4309 \\ \times 9 \\ \hline 38\,781 \end{array}$
11. $\begin{array}{r} 26 \\ \times 40 \\ \hline 1040 \end{array}$
12. $\begin{array}{r} 27 \\ \times 20 \\ \hline 540 \end{array}$
13. $\begin{array}{r} 46 \\ \times 50 \\ \hline 2300 \end{array}$
14. $\begin{array}{r} 81 \\ \times 17 \\ \hline 1377 \end{array}$
15. $\begin{array}{r} 43 \\ \times 19 \\ \hline 817 \end{array}$
16. $\begin{array}{r} 25 \\ \times 16 \\ \hline 400 \end{array}$
17. $\begin{array}{r} 49 \\ \times 57 \\ \hline 2793 \end{array}$
18. $\begin{array}{r} 48 \\ \times 23 \\ \hline 1104 \end{array}$
19. $\begin{array}{r} 97 \\ \times 34 \\ \hline 3298 \end{array}$
20. $\begin{array}{r} 75 \\ \times 53 \\ \hline 3975 \end{array}$
21. $\begin{array}{r} 27¢ \\ \times 5 \\ \hline 135 \end{array}$
22. $\begin{array}{r} \$4.83 \\ \times 3 \\ \hline \$14.49 \end{array}$
23. $\begin{array}{r} \$24.95 \\ \times 8 \\ \hline \$199.60 \end{array}$
24. $\begin{array}{r} \$5.90 \\ \times 2 \\ \hline \$11.80 \end{array}$
25. $\begin{array}{r} \$6.05 \\ \times 22 \\ \hline \$133.10 \end{array}$

COMPUTATION: +, -

Add.

1. $\begin{array}{r} 46 \\ + 53 \\ \hline 99 \end{array}$
2. $\begin{array}{r} 76 \\ + 28 \\ \hline 104 \end{array}$
3. $\begin{array}{r} 89 \\ + 78 \\ \hline 167 \end{array}$
4. $\begin{array}{r} 295 \\ + 384 \\ \hline 679 \end{array}$
5. $\begin{array}{r} 417 \\ + 235 \\ \hline 652 \end{array}$
6. $9 + 5 + 4 = 18$
7. $64 + 28 + 55 = 147$
8. $39 + 75 + 85 = 199$
9. $\begin{array}{r} 2417 \\ + 3428 \\ \hline 5845 \end{array}$
10. $\begin{array}{r} 9453 \\ + 1476 \\ \hline 10929 \end{array}$
11. $\begin{array}{r} 5691 \\ + 673 \\ \hline 6364 \end{array}$
12. $\begin{array}{r} 46195 \\ + 7249 \\ \hline 53444 \end{array}$
13. $\begin{array}{r} 78417 \\ + 63986 \\ \hline 142403 \end{array}$
14. $672 + 3 + 89 = 764$
15. $209 + 86 + 376 = 671$

Subtract.

16. $\begin{array}{r} 68 \\ - 25 \\ \hline 43 \end{array}$
17. $\begin{array}{r} 35 \\ - 29 \\ \hline 6 \end{array}$
18. $\begin{array}{r} 72 \\ - 47 \\ \hline 25 \end{array}$
19. $\begin{array}{r} 374 \\ - 122 \\ \hline 252 \end{array}$
20. $\begin{array}{r} 509 \\ - 273 \\ \hline 236 \end{array}$
21. $\begin{array}{r} 625 \\ - 279 \\ \hline 346 \end{array}$
22. $\begin{array}{r} 580 \\ - 499 \\ \hline 81 \end{array}$
23. $\begin{array}{r} 2700 \\ - 929 \\ \hline 1771 \end{array}$
24. $\begin{array}{r} 4070 \\ - 2652 \\ \hline 1418 \end{array}$
25. $\begin{array}{r} 8000 \\ - 4173 \\ \hline 3827 \end{array}$

Subtract.

26. $904 - 475 = 429$
27. $357 - 194 = 163$
28. $800 - 256 = 544$

Add or subtract.

29. $\begin{array}{r} 5.9 \\ + 6.7 \\ \hline 12.6 \end{array}$
30. $\begin{array}{r} 42.6 \\ + 75.9 \\ \hline 118.5 \end{array}$
31. $\begin{array}{r} 3.86 \\ + 7.93 \\ \hline 11.79 \end{array}$
32. $\begin{array}{r} 57.8 \\ - 1.9 \\ \hline 55.9 \end{array}$
33. $\begin{array}{r} 37.96 \\ - 8.77 \\ \hline 29.19 \end{array}$

Solve.

34. This month the Vargas family spent \$425.30 on groceries. Last month they spent \$396.98. How much more did they spend this month? $\$28.32$
35. There were 32 teachers, 148 students, and 312 parents at a school gymnastics demonstration. How many people were there in all? 492

26. $\begin{array}{r} 1.9 \\ \times 8 \\ \hline 15.2 \end{array}$
27. $\begin{array}{r} 3.2 \\ \times 7 \\ \hline 22.4 \end{array}$
28. $\begin{array}{r} 4.5 \\ \times 61 \\ \hline 274.5 \end{array}$
29. $\begin{array}{r} 9.3 \\ \times 28 \\ \hline 260.4 \end{array}$
30. $\begin{array}{r} 6.4 \\ \times 15 \\ \hline 96 \end{array}$

Solve.

31. The temperature outside was 18°C . Jason wanted to go swimming. His mother told him he could go when the temperature was 7°C warmer. What temperature would it be then? 25°C
32. One carton holds 125 candy bars. How many candy bars would there be in 9 cartons? 1125
33. After the track meet, the 27 members of the track team each had a hamburger and milkshake. The hamburgers cost \$1.39 each and the milkshakes cost \$0.75 each. How much did it cost to feed the team? $\$57.78$
34. A small plane travelled at a speed of 321 kilometres per hour. How far can it go in 5 h? 1605 km

UNIT 4

Division

Theme: Processing Food

Lesson		Objective	Pages
Preview		Basic facts, with divisors up to 9; no remainders.	73
1	A18	Divide a two-digit dividend by a one-digit divisor (one EMS cycle), with or without remainders.	74-75
2	A19	Divide a three-digit dividend by a one-digit divisor (one EMS cycle), where the first two digits of the dividend are a multiple of the divisor.	76-77
3	A20	Divide a two- or three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.	78-79
4	A21	Divide a three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.	80-81
5	A22	Divide a three-digit dividend by a one-digit divisor (three EMS cycles), with remainders.	82-83
6	A23	Divide a four-digit dividend by a one-digit divisor (three EMS cycles), with remainders.	84-85
7	A24	Divide a four-digit dividend by a one-digit divisor (four EMS cycles), with remainders.	86-87
8	A25	Divide with zero in the quotient.	88-89
9	M3	Divide with money.	90-91
10	PS3	Solve problems involving multiplication or division.	92-93
Test		Division	94
Review		Multiplication	95

About This Unit

The aim of the unit is to establish firmly the division algorithm. Two-, three-, and four-digit dividends are divided by one-digit divisors.

The lessons are carefully arranged in order of difficulty and should be taken in sequence.

The lesson examples and problems in this unit demonstrate the two types of division questions, partition and measurement.

partition **measurement**

12 items

12 items

3 in each group

3 groups

How many groups? How many in each group?

Both questions are solved by the equation:

$$12 \div 3 = 4.$$

The division algorithm taught in this unit is best illustrated by measurement division problems.

However, both types of problems must be presented. Grade 5 students should realize that the algorithm is a means to an end. The algorithm serves equally well in solving both measurement and partitive problems.

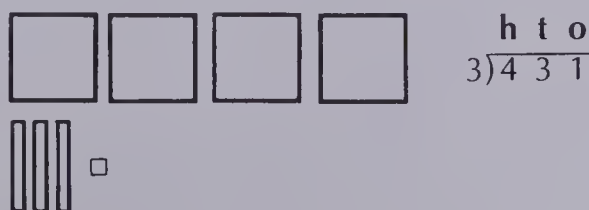
Whenever possible, the lesson example should be illustrated with concrete materials, such as powers of ten materials, trading chips, and dot paper, so that the students grasp the *meaning* of division. (See the *Ideas* section of this introduction.)

Students who are having difficulty with basic multiplication and division facts may be helped by using a temporary crutch, such as a table.

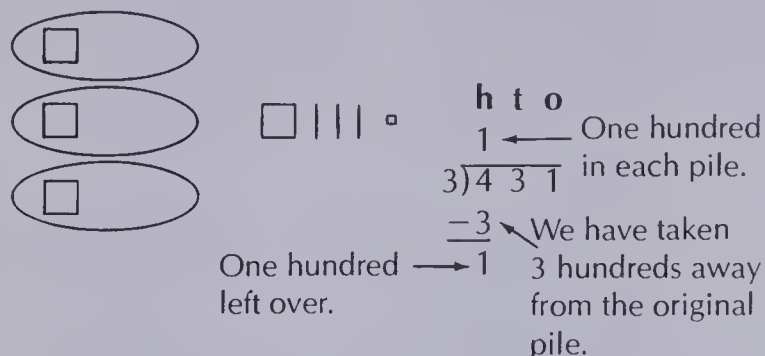
It may help some students to learn the algorithm if they recall the acronym EMS (estimate, multiply, subtract) for each cycle. Teach them to check their division results with multiplication.

Ideas

Use base-ten blocks repeatedly in this unit to illustrate the division algorithm. The measurement algorithm was chosen because it lends itself to this approach. For example, divide 431 by 3.

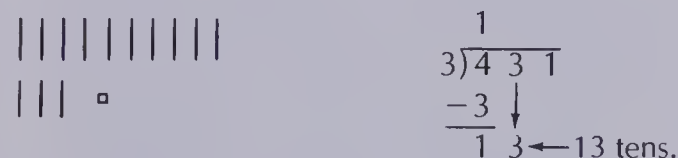


Divide hundreds. Make three piles with a hundred in each pile. There is one hundred left over. There is one hundred left over.



Now trade the left-over hundred for 10 tens.

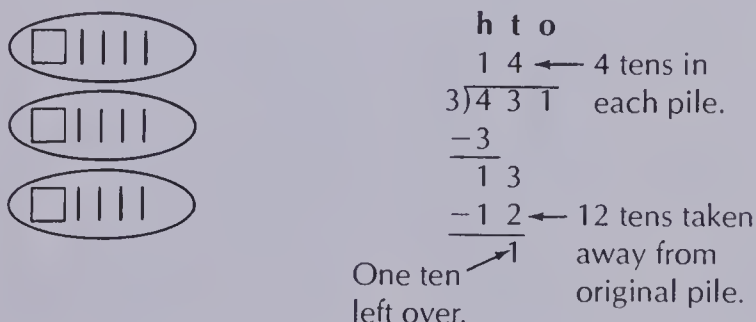
We have 13 tens.



Divide the tens.

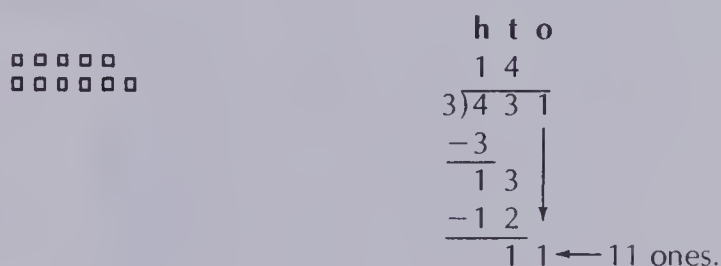
Put the tens in 3 equal piles.

There are 4 tens in each pile with one ten left over.



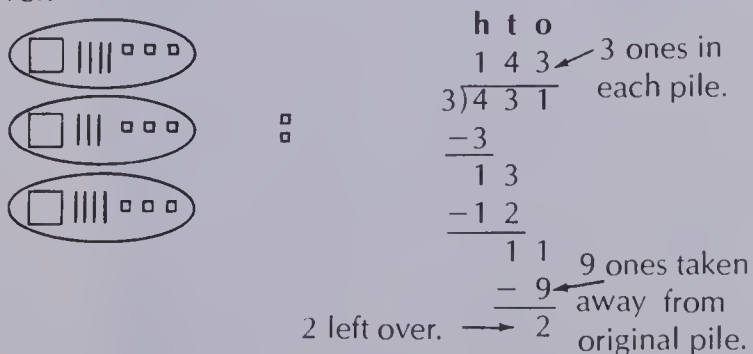
Trade the left-over ten for 10 ones.

We have 11 ones.



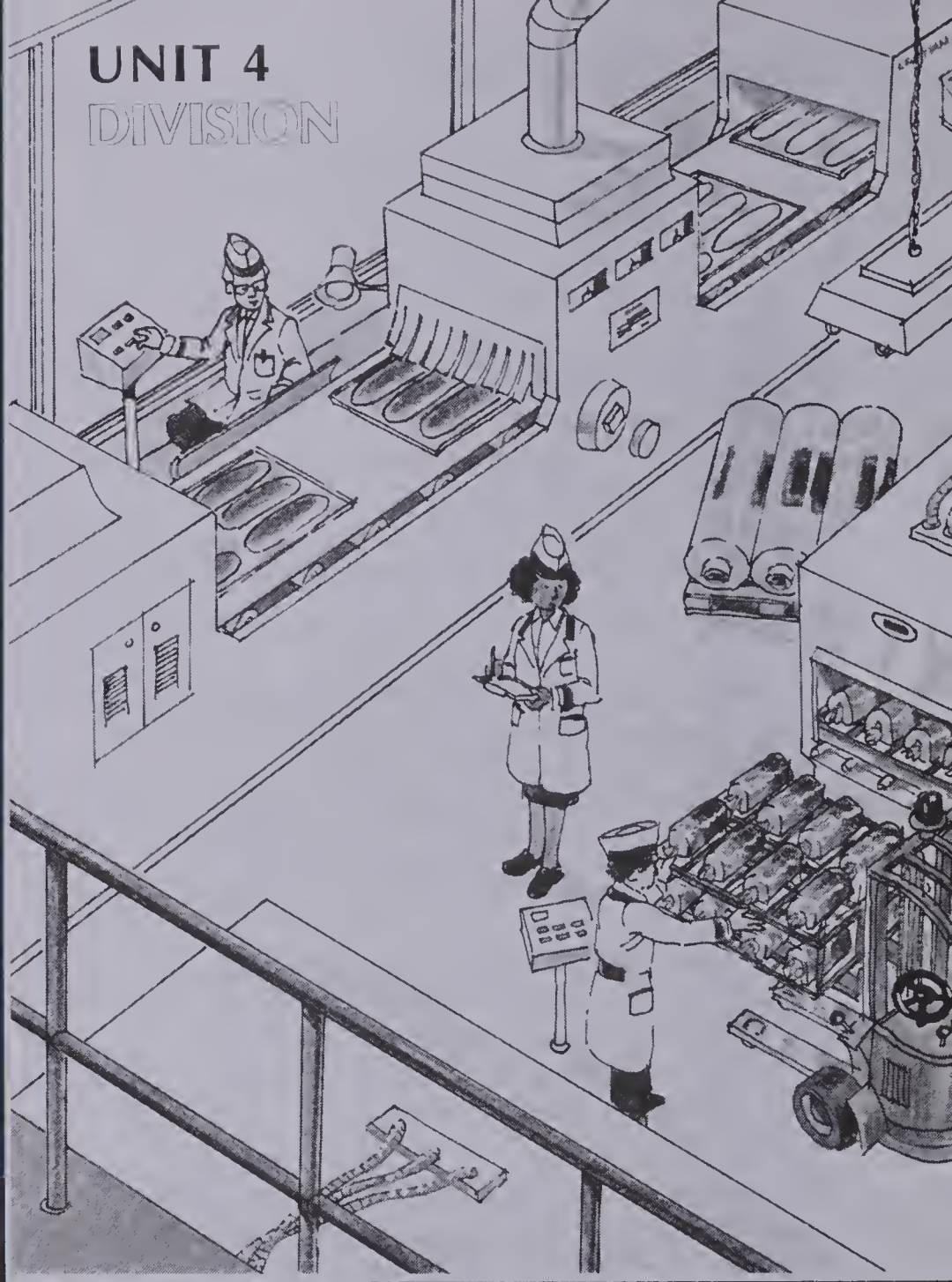
Divide the ones.

There are 3 ones in each pile with 2 left over.



UNIT 4

DIVISION



Unit 4 Objective	Test Questions	Pages
A18	1- 5	74-75
A19	6-10	76-77
A20	11-15	78-79
A21	16-20	80-81
A22	21-24	82-83
A23	25-28	84-85
A24	29-32	86-87
A25	33-36	88-89
M3	37-40	90-91
PS	41-44	

Pretest

Divide.

- $5 \overline{)45}$ 9
- $9 \overline{)29}$ $3R2$
- $8 \overline{)53}$ $6R5$
- $2 \overline{)19}$ $9R1$
- $4 \overline{)31}$ $7R3$
- $9 \overline{)183}$ $20R3$
- $6 \overline{)304}$ $50R4$
- $5 \overline{)352}$ $70R2$
- $8 \overline{)407}$ $50R7$
- $4 \overline{)282}$ $70R2$
- $8 \overline{)89}$ $11R1$
- $5 \overline{)107}$ $21R2$
- $9 \overline{)189}$ 21
- $3 \overline{)98}$ $32R2$
- $4 \overline{)369}$ $92R1$
- $2 \overline{)57}$ $28R1$
- $6 \overline{)352}$ $58R4$
- $5 \overline{)237}$ $47R2$
- $9 \overline{)828}$ 92
- $4 \overline{)344}$ 86
- $3 \overline{)373}$ $124R1$
- $8 \overline{)907}$ $113R3$
- $4 \overline{)616}$ 154
- $7 \overline{)819}$ 117
- $6 \overline{)3672}$ 612

Unit 4

Division Bake-Off

How fast can you complete the division tables?

ones		
10	$10 \div 1$	5
9	$9 \div 1$	4
8	$8 \div 1$	3
7	$7 \div 1$	2
6	$6 \div 1$	1

twos		
9	$18 \div 2$	10
7	$14 \div 2$	2
3	$6 \div 2$	4
8	$16 \div 2$	5
6	$12 \div 2$	1

threes		
6	$18 \div 3$	10
9	$27 \div 3$	7
5	$15 \div 3$	2
3	$9 \div 3$	1
4	$12 \div 3$	8

fours		
4	$16 \div 4$	1
10	$40 \div 4$	8
3	$12 \div 4$	4
2	$8 \div 4$	7
9	$36 \div 4$	3

fives		
10	$50 \div 5$	3
5	$25 \div 5$	9
6	$30 \div 5$	7
1	$5 \div 5$	2
4	$20 \div 5$	8

sixes		
1	$6 \div 6$	3
6	$36 \div 6$	5
7	$42 \div 6$	9
2	$12 \div 6$	10
4	$24 \div 6$	7

sevens		
2	$14 \div 7$	9
10	$70 \div 7$	6
3	$21 \div 7$	5
7	$49 \div 7$	8
1	$7 \div 7$	4

eights		
2	$16 \div 8$	1
4	$32 \div 8$	5
7	$56 \div 8$	3
8	$64 \div 8$	6
10	$80 \div 8$	9

nines		
9	$81 \div 9$	10
1	$9 \div 9$	5
8	$72 \div 9$	4
2	$18 \div 9$	6
3	$27 \div 9$	7

tens				
100 ÷ 10	60 ÷ 10	80 ÷ 10	20 ÷ 10	30 ÷ 10
70 ÷ 10	90 ÷ 10	0 ÷ 10	10 ÷ 10	50 ÷ 10
10	6	8	2	3
7	9	0	1	5

73

UNIT 4

PREVIEW

Suggestions

Having just reviewed the multiplication tables and used them to multiply in the last chapter, the students will be familiar with them. Refer to the $2 \times$ table:

$$\begin{aligned} 2 \times 0 &= 0 \\ 2 \times 1 &= 2 \\ 2 \times 2 &= 4 \end{aligned}$$

The division tables are taken from these.

$$\begin{aligned} 0 \div 2 &= 0 \\ 2 \div 2 &= 1 \\ 4 \div 2 &= 2 \end{aligned}$$

Review: $4 \times 7 = 28$
 $28 \div 7 = 4$

Give multiplication equations and ask for the division equations.

$$\begin{aligned} 3 \times 6 &= 18 \\ 18 \div 3 &= 6 \end{aligned}$$

Have the students look at a set of division questions and give the multiplication sentences.

$$\begin{aligned} 25 \div 5 &= \blacksquare \\ 5 \times \blacksquare &= 25 \end{aligned}$$

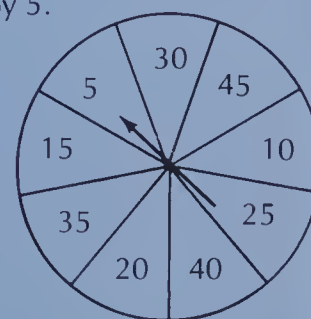
About the Page

The page can be done as oral drill having students, one-by-one, give the answers then the questions in order. Alternatively, the page can be given as a pencil-and-paper assignment. Make it a race with bonus points to the first finished, and penalty points for wrong answers.

Reinforcement

Use a spinner to practise division facts. Make up game boards. Draw a large circle with nine sections. Put a paper fastener through the centre. Put a paper clip or bobby pin around the fastener. Label each board with one table (multiples of 5 to 45). Make one for each table.

Divide by 5.



26. $5 \overline{)3198}$ $639R3$ 27. $3 \overline{)2294}$ $764R2$ 28. $9 \overline{)6588}$ 732 29. $3 \overline{)9462}$ 3154 30. $7 \overline{)8055}$ $1150R5$
31. $6 \overline{)9577}$ $1596R1$ 32. $4 \overline{)6581}$ $1645R1$ 33. $8 \overline{)851}$ $106R3$ 34. $3 \overline{)919}$ $306R1$ 35. $7 \overline{)4967}$ $709R4$
36. $8 \overline{)8072}$ 1009 37. $7 \overline{)5384}$ $\$54R6$ 38. $6 \overline{)\$0.55}$ $\$0.09R1$ 39. $8 \overline{)\$9.27}$ $\$1.15R7$ 40. $4 \overline{)\$27.35}$ $\$6.83R3$

Solve.

41. There are 9 tomatoes in each box and 891 tomatoes in all.
How many boxes are there? 99
42. Grapefruit cost 3 for \$1. What is the cost of one? \$0.33 R1
43. 958 kg of potatoes are packed in 5 kg bags.
How many bags are there? 191 R3
44. Eight lottery winners shared a \$10 prize.
How much did each person receive? \$1.25

Objective A18

Divide a two-digit dividend by a one-digit divisor (one EMS cycle), with or without remainders.

Introducing the Lesson

Review the meaning of division.

Ask, "How many 4s in 24?" $24 \div 4 = ?$

We know that $6 \times 4 = 24$

So: $24 \div 4 = 6$.

There are six 4s in 24.

Review the two ways to express this.

$$24 \div 4 = 6 \quad 4 \overline{)24}$$

Review the vocabulary of division.

$$\begin{array}{ccc} 24 & \div & 4 = 6 \\ \uparrow & & \uparrow \\ \text{dividend} & & \text{quotient} \\ & \uparrow & \\ & \text{divisor} & \end{array}$$

Teaching the Lesson

Show how the vertical form of division can be used to check the result. Estimate the quotient. Multiply the quotient by the divisor.

$$\begin{array}{r} 5 \leftarrow \text{too small} \quad 7 \leftarrow \text{too big} \\ 4 \overline{)24} \quad 4 \overline{)24} \\ -20 \quad -28 \\ \hline 4 \end{array}$$

Teach that when the remainder is either 0 or less than the divisor, the maximum number of multiples has been obtained.

Do several examples with the students, emphasizing the three steps: *estimate*, *multiply*, *subtract* (or EMS, for short).

Show some examples with remainders.

$$43 \div 5$$

$$\begin{array}{r} 8 \text{ Estimate.} \quad 8 \text{ Multiply.} \\ 5 \overline{)43} \quad 5 \overline{)43} \\ \quad 40 \end{array}$$

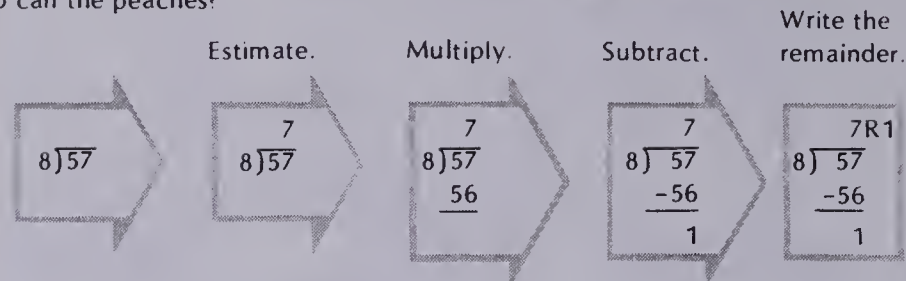
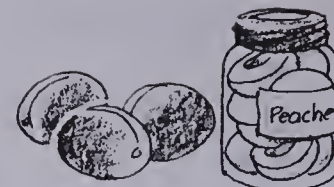
$$\begin{array}{r} 8 \text{ Subtract.} \\ 5 \overline{)43} \\ -40 \\ \hline 3 \end{array}$$

8R3

Explain that the symbol $5 \overline{)43}$ is a short way of saying that 43 divided by 5 is equal to 8, with a remainder of 3. Discuss the meaning of the remainder.

One-Stage Division

Carl is helping his mother can peaches. They have 57 peaches to can. Eight peaches fit in a jar. Will 6 jars be enough to can the peaches?



No, 7 jars are needed.
One peach will be left over.

Check: Multiply the quotient by the divisor

$$\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \\ + 1 \\ \hline 57 \end{array}$$

and add the remainder to get the dividend

EXERCISES

Copy and complete each division.

$$\begin{array}{lllll} 1. \begin{array}{r} 8 \\ 5 \overline{)40} \\ -40 \\ \hline \end{array} & 2. \begin{array}{r} 8R2 \\ 5 \overline{)42} \\ -40 \\ \hline \end{array} & 3. \begin{array}{r} 8R4 \\ 5 \overline{)44} \\ -40 \\ \hline \end{array} & 4. \begin{array}{r} 9 \\ 5 \overline{)45} \\ -45 \\ \hline \end{array} & 5. \begin{array}{r} 9R3 \\ 5 \overline{)48} \\ -45 \\ \hline \end{array} \\ 6. \begin{array}{r} 6 \\ 9 \overline{)54} \\ -54 \\ \hline \end{array} & 7. \begin{array}{r} 6R1 \\ 9 \overline{)55} \\ -54 \\ \hline \end{array} & 8. \begin{array}{r} 6R5 \\ 9 \overline{)59} \\ -54 \\ \hline \end{array} & 9. \begin{array}{r} 6R8 \\ 9 \overline{)62} \\ -54 \\ \hline \end{array} & 10. \begin{array}{r} 7 \\ 9 \overline{)63} \\ -63 \\ \hline \end{array} \\ 11. \begin{array}{r} 4R3 \\ 6 \overline{)27} \\ -24 \\ \hline \end{array} & 12. \begin{array}{r} 5R5 \\ 6 \overline{)35} \\ -30 \\ \hline \end{array} & 13. \begin{array}{r} 5 \\ 6 \overline{)30} \\ -30 \\ \hline \end{array} & 14. \begin{array}{r} 5R1 \\ 4 \overline{)21} \\ -20 \\ \hline \end{array} & 15. \begin{array}{r} 8R4 \\ 7 \overline{)60} \\ -56 \\ \hline \end{array} \end{array}$$

Divide. Check your answers.

$$\begin{array}{lllll} 16. \begin{array}{r} 3R6 \\ 8 \overline{)30} \\ -24 \\ \hline \end{array} & 17. \begin{array}{r} 4R2 \\ 3 \overline{)14} \\ -12 \\ \hline \end{array} & 18. \begin{array}{r} 8R6 \\ 8 \overline{)70} \\ -64 \\ \hline \end{array} & 19. \begin{array}{r} 6R3 \\ 7 \overline{)45} \\ -42 \\ \hline \end{array} & 20. \begin{array}{r} 9R3 \\ 4 \overline{)39} \\ -36 \\ \hline \end{array} \\ 21. 25 \div 8 & 3R1 & 22. 17 \div 5 & 3R2 & 23. 46 \div 6 & 7R4 \end{array}$$

Using the Exercises

- The first and second rows each deal with one table. This allows the students to work with the concept without the distraction of different divisors.
- Questions 11 to 23 have a mixture of tables and the students must know them to do these proficiently. Students experiencing difficulty will need more drill with basic facts and with concrete materials to model the algorithm.

PRACTICE

Find the quotient.

1. $4 \overline{)194R3}$
2. $2 \overline{)13} \text{ } 6R1$
3. $6 \overline{)39} \text{ } 6R3$
4. $8 \overline{)60} \text{ } 7R4$
5. $7 \overline{)33} \text{ } 4R5$
6. $9 \overline{)48} \text{ } 5R3$
7. $5 \overline{)30} \text{ } 6$
8. $6 \overline{)47} \text{ } 7R5$
9. $7 \overline{)25} \text{ } 3R4$
10. $8 \overline{)38} \text{ } 4R6$
11. $9 \overline{)54} \text{ } 6$
12. $4 \overline{)35} \text{ } 8R3$
13. $7 \overline{)62} \text{ } 8R6$
14. $8 \overline{)71} \text{ } 8R7$
15. $9 \overline{)88} \text{ } 9R7$

Divide. Check your answer.

16. $19 \div 3 \text{ } 6R1$
17. $28 \div 5 \text{ } 5R3$
18. $64 \div 7 \text{ } 9R1$
19. $53 \div 6 \text{ } 8R5$
20. $70 \div 9 \text{ } 7R7$
21. $34 \div 7 \text{ } 4R6$
22. $26 \div 9 \text{ } 2R8$
23. $38 \div 6 \text{ } 6R2$
24. $83 \div 9 \text{ } 9R2$
25. $58 \div 6 \text{ } 9R4$

Divide each number by 8.

26. $72 \div 8 \text{ } 9$
27. $31 \div 8 \text{ } 3R7$
28. $21 \div 8 \text{ } 2R5$
29. $39 \div 8 \text{ } 4R7$
30. $52 \div 8 \text{ } 6R4$

Solve.

31. Mrs. Sweeney has 17 L of tomato sauce to can. How many 2 L jars can she fill? $8R1L$
32. Mrs. Sweeney has 71 cucumbers to make into dill pickles. Nine cucumbers fit into one jar. Are 8 jars enough to can the cucumbers? yes
33. It took Mrs. Sweeney 6 h to prepare 42 jars of canned food. How many jars per hour was that? 7

Using Your Head

All of the numbers below are evenly divisible by 9.

How can you tell without dividing?

$all\ digits\ add\ to\ 9.$

54 117 351 612 81 108 432

Which numbers below are evenly divisible by 9?

405 209 702 135 614 126 521
 45 78 15 14 75

Assigning the Practice

Minimum: 1-10, 16-20, 31

Average: 11-32

Enriched: 21-33

Reinforcement

Have students practise problem tables by using spinners as described on page 73.

Enrichment

Assign *Using Your Head*, page 75.

The digits in a number divisible by 9 add to 9 or a multiple of 9.

Extra Practice

Divide and check.

1. $2 \overline{)6} \text{ } 3$
2. $3 \overline{)9} \text{ } 3$
3. $4 \overline{)6} \text{ } 1R2$
4. $5 \overline{)35} \text{ } 7$
5. $6 \overline{)51} \text{ } 8R3$
6. $6 \overline{)37} \text{ } 6R1$
7. $2 \overline{)15} \text{ } 7R1$
8. $7 \overline{)42} \text{ } 6$
9. $7 \overline{)45} \text{ } 6R3$
10. $8 \overline{)48} \text{ } 6$
11. $8 \overline{)51} \text{ } 6R3$
12. $7 \overline{)55} \text{ } 7R6$
13. $9 \overline{)74} \text{ } 8R2$
14. $4 \overline{)39} \text{ } 9R3$
15. $5 \overline{)44} \text{ } 8R4$

Solve.

16. In a warehouse, 5 workers have to move 45 cases. If the job is divided evenly, how many cases must each person move? 9
17. Elsa is sharing a bag of candy with 2 friends. If there are 25 candies in the bag, how many candies will each of the 3 get? Elsa gets her share plus the leftovers. How many candies will Elsa get? $8\ each\ for\ 2\ friends,\ Elsa\ gets\ 9$

Worksheet A18

Pages 74-75

Objective A19

Divide a three-digit dividend by a one-digit divisor (one EMS cycle), where the first two digits of the dividend are a multiple of the divisor.

Introducing the Lesson

Point out that no matter how large the dividend is the procedure is the same. Determine the divisor. Estimate: count by that table till you get as close as you can to the number without going over. Some additional drill in the basic facts may be advisable at this point.

Teaching the Lesson

On the chalkboard, write $21 \div 7 = ?$. Then ask, "What is 21 tens divided by 7?"

Write $\begin{array}{r} 3 \\ 7 \overline{)21} \end{array}$ and $\begin{array}{r} 30 \\ 7 \overline{)210} \end{array}$

Read the problem at the top of page 76 and work through the example.

Ask: "Can we divide 2 by 7?" No.

"Can we divide 21 by 7?" Yes.

Estimate: 21 tens $\div 7 = 3$ tens. $\begin{array}{r} 3 \\ 7 \overline{)214} \end{array}$

This can be illustrated with base ten materials as outlined in the introduction (page 72B).

Multiply: $3 \times 7 = 21$ $\begin{array}{r} 3 \\ 7 \overline{)214} \\ \underline{21} \end{array}$

Subtract. $\begin{array}{r} 3 \\ 7 \overline{)214} \\ \underline{21} \\ 0 \end{array}$

Bring down the 4. $\begin{array}{r} 3 \\ 7 \overline{)214} \\ \underline{-21} \downarrow \\ 04 \end{array}$

"Can we divide 4 by 7?" No.

So: $\begin{array}{r} 30 \\ 7 \overline{)214} \\ \underline{-21} \end{array}$ or $\begin{array}{r} 30R4 \\ 7 \overline{)214} \\ \underline{-21} \\ 04 \end{array}$

Discuss the meaning of R4 (the remainder is 4). Show how to check by multiplying and adding. Do other examples as needed.

One-Stage Division

After catching 214 smelt one evening, Joanna and her father froze them. They put them in 7 plastic bags. About how many fish were in each bag?



Divide
21 tens by 7.

Remember
the ones.

Write the
remainder.

$$\begin{array}{r} 7 \overline{)214} \end{array}$$

$$\begin{array}{r} 3 \\ 7 \overline{)214} \\ \underline{-21} \\ 0 \end{array}$$

$$\begin{array}{r} 30 \\ 7 \overline{)214} \\ \underline{-21} \downarrow \\ 04 \end{array}$$

$$\begin{array}{r} 30R4 \\ 7 \overline{)214} \\ \underline{-21} \\ 04 \end{array}$$

There were about 30 smelt in each bag.

Check: $\begin{array}{r} 30 \text{ quotient} \\ \times 7 \text{ divisor} \\ \hline 210 \\ + 4 \text{ remainder} \\ \hline 214 \text{ dividend} \end{array}$

EXERCISES

Divide.

$$1. \begin{array}{r} 2 \\ 3 \overline{)6} \end{array}$$

$$2. \begin{array}{r} 20 \\ 3 \overline{)60} \end{array}$$

$$3. \begin{array}{r} 20R1 \\ 3 \overline{)61} \end{array}$$

$$4. \begin{array}{r} 20R2 \\ 3 \overline{)62} \end{array}$$

$$5. \begin{array}{r} 2 \\ 4 \overline{)8} \end{array}$$

$$6. \begin{array}{r} 20 \\ 4 \overline{)80} \end{array}$$

$$7. \begin{array}{r} 20R1 \\ 4 \overline{)81} \end{array}$$

$$8. \begin{array}{r} 20R3 \\ 4 \overline{)83} \end{array}$$

$$9. \begin{array}{r} 7 \\ 9 \overline{)63} \end{array}$$

$$10. \begin{array}{r} 70 \\ 9 \overline{)630} \end{array}$$

$$11. \begin{array}{r} 70R5 \\ 9 \overline{)635} \end{array}$$

$$12. \begin{array}{r} 70R4 \\ 9 \overline{)634} \end{array}$$

$$13. \begin{array}{r} 10R2 \\ 5 \overline{)52} \end{array}$$

$$14. \begin{array}{r} 10R3 \\ 7 \overline{)73} \end{array}$$

$$15. \begin{array}{r} 40R7 \\ 8 \overline{)327} \end{array}$$

$$16. \begin{array}{r} 50R1 \\ 6 \overline{)301} \end{array}$$

Divide. Check your answer.

$$17. \begin{array}{r} 43 \div 4 \\ 10R3 \end{array}$$

$$18. \begin{array}{r} 92 \div 9 \\ 10R2 \end{array}$$

$$19. \begin{array}{r} 642 \div 8 \\ 80R2 \end{array}$$

$$20. \begin{array}{r} 452 \div 5 \\ 90R2 \end{array}$$

Using the Exercises

- Questions 1 to 4, 5 to 8, and 9 to 12 deal with the same divisor. The students are led from a basic fact, to a multiple of ten, to one-step division with a remainder.
- Questions 13 to 16 are mixed. Be sure students are doing these correctly before continuing.
- Questions 17 to 20 require the students to set up the vertical form themselves. Make sure they are doing it properly. (More able students may do these mentally.)

PRACTICE

Find the quotient.

1. $7 \overline{)351}$ **50R1**
2. $3 \overline{)182}$ **60R2**
3. $8 \overline{)405}$ **50R5**
4. $9 \overline{)450}$ **50**
5. $5 \overline{)151}$ **30R1**
6. $6 \overline{)425}$ **70R5**
7. $9 \overline{)275}$ **30R5**
8. $4 \overline{)242}$ **60R2**
9. $8 \overline{)640}$ **80**
10. $8 \overline{)165}$ **20R5**
11. $5 \overline{)202}$ **40R2**
12. $6 \overline{)303}$ **50R3**
13. $9 \overline{)810}$ **90**
14. $7 \overline{)283}$ **40R3**
15. $9 \overline{)726}$ **80R6**

Divide. Check your answers.

16. $182 \div 6$ **30R2**
17. $280 \div 4$ **70**
18. $496 \div 7$ **70R6**
19. $140 \div 2$ **70**
20. $721 \div 8$ **90R1**
21. $323 \div 4$ **80R3**
22. $120 \div 2$ **60**
23. $271 \div 3$ **90R1**
24. $565 \div 8$ **70R5**
25. $563 \div 7$ **80R3**

Write a division question for each checking statement.

26. $50 \times 5 + 1 = 251$ **$251 \div 5 = 50R1$**
27. $50 \times 4 + 1 = 201$ **$201 \div 4 = 50R1$**
28. $40 \times 9 + 4 = 364$ **$364 \div 9 = 40R4$**

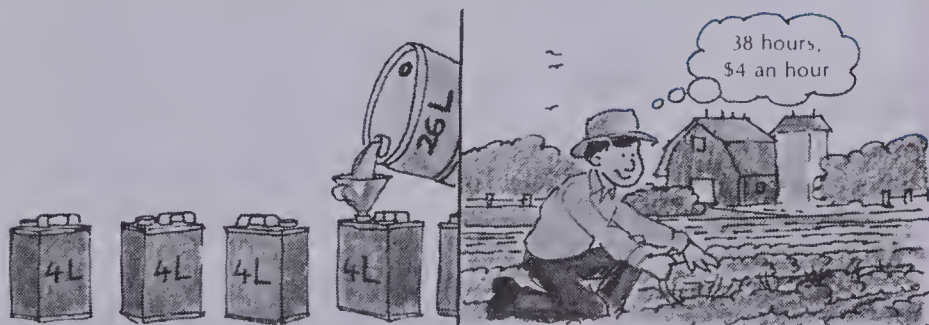
Solve.

29. There are 350 seats for viewing basketball games. If the seats are in 5 equal sections, how many seats are in each section? **70**
30. Patrick delivers 360 newspapers in six days. How many papers would he usually deliver each day? **60**

Imagine

Make up a story problem for each picture.

Answers will vary.



77

Assigning the Practice

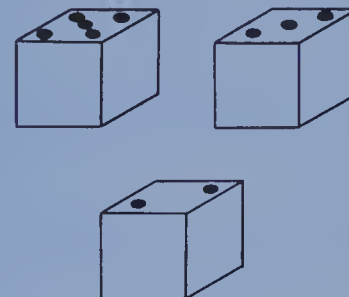
Minimum: 1-10, 16-20, 29

Average: 11-29

Enriched: 16-30

Reinforcement

Have a student roll 3 dice, make all possible 3-digit numerals, and record them.



235
325
532
523
253
352

Then the student divides each number by 7, 8, and 9. Have him/her trade with a partner to check the answers.

Enrichment

1. Assign *Imagine* at the bottom of page 77. Have the students use the information in each picture to make up a story problem. Place the problems at a centre to be shared by others.
2. Try to make up story problems using division. Place them at the centre for others to try.

Extra Practice

Divide and check.

1. $7 \overline{)423}$ **60R3**
2. $3 \overline{)212}$ **70R2**
3. $8 \overline{)324}$ **40R4**
4. $9 \overline{)541}$ **60R1**
5. $5 \overline{)253}$ **50R3**
6. $6 \overline{)360}$ **60**
7. $9 \overline{)458}$ **50R8**
8. $4 \overline{)163}$ **40R3**
9. $8 \overline{)725}$ **90R5**
10. $7 \overline{)490}$ **70**
11. $5 \overline{)301}$ **60R1**
12. $2 \overline{)121}$ **60R1**
13. $3 \overline{)272}$ **90R2**
14. $8 \overline{)484}$ **60R4**
15. $6 \overline{)483}$ **80R3**

Solve

16. Mrs. Loomis drove 152 km in a five-day work week. She drove about the same distance each day. About how many kilometres did she drive each day? **30 km**
17. A canning factory pays its workers \$80 for an eight-hour day. How much do the workers receive for each hour? How much do they make in a five-day week? **\$10/h \$400/week**

Worksheet A19

Pages 76-77

Objective A20

Divide a two- or three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.

Introducing the Lesson

Review one-stage division, using the three steps: estimate, multiply, subtract (EMS). Do several examples together. Remember to encourage the students to get as close as they can (counting, if necessary) with their estimate.

Teaching the Lesson

Work the example $3\overline{)95}$ in two stages to show that it can be done in two applications of the EMS cycle. (Do the second division exercise in a different coloured chalk.)

3 tens $3\overline{)9}$ tens $\underline{-9}$ 0	1 one $3\overline{)5}$ ones $\underline{-3}$ 2
--	---

3 tens and 1 one, remainder 2, is 31 R2. Show that this can be written in one exercise. (Show the second division cycle in the different coloured chalk.)

$$\begin{array}{r} 31R2 \\ 3\overline{)95} \\ \underline{-9} \downarrow \\ 05 \\ \underline{-3} \\ 2 \end{array}$$

Discuss the "bringing down" of the ones. (It is easier to see and work with the ones if they are written where the work of the first cycle leaves off, and where they can be combined with the left-over tens.)

Do another example together at the chalk-board (an example with a remainder after the first EMS cycle). Illustrate the example with base ten blocks as outlined in the introduction (page 72B).

3 $2\overline{)75}$ $\underline{-6}$ 1	37R1 $2\overline{)75}$ $\underline{-6} \downarrow$ 15 $\underline{-14}$ 1
---	--

Point out that the remaining ten from the first EMS cycle must be included (as 10 ones) in the next cycle. Work through the lesson example together, also illustrating the steps with base ten blocks.

Two-Stage Division

Mr. Bavari found that he had grown 87 g of dried basil. He put it in equal amounts in 6 airtight jars. About how many grams were in each jar?



Divide 8 tens by 6.	Remember the ones.	Divide 27 by 6.	Write the remainder.
$6\overline{)87}$	$\begin{array}{r} 1 \\ 6\overline{)87} \\ \underline{-6} \\ 27 \end{array}$	$\begin{array}{r} 1 \\ 6\overline{)87} \\ \underline{-6} \\ 27 \end{array}$	$\begin{array}{r} 14R3 \\ 6\overline{)87} \\ \underline{-6} \\ 27 \\ \underline{-24} \\ 3 \end{array}$

There were about 14 grams in each jar.

EXERCISES

Copy and complete each division.

1. $4\overline{)83}$ $\underline{-8}$ 20R3 03	2. $3\overline{)62}$ $\underline{-6}$ 20R2 02	3. $4\overline{)85}$ $\underline{-8}$ 21R1 05	4. $5\overline{)59}$ $\underline{-5}$ 11R4 09	5. $6\overline{)127}$ $\underline{-12}$ 21R1 07
6. $3\overline{)37}$ $\underline{-12}$ 1R1 1R	7. $5\overline{)74}$ $\underline{-32}$ 14R4 1R	8. $6\overline{)71}$ $\underline{-10}$ 11R5 1R	9. $8\overline{)95}$ $\underline{-11}$ 11R7 1R	10. $4\overline{)166}$ $\underline{-16}$ 41R2 4R
11. $4\overline{)42}$ $\underline{-40}$ 10R2	12. $3\overline{)98}$ $\underline{-32}$ 32R2	13. $7\overline{)71}$ $\underline{-10}$ 10R1	14. $5\overline{)108}$ $\underline{-25}$ 21R3	15. $6\overline{)429}$ $\underline{-36}$ 71R3

Divide. Check your answer.

16. $45 \div 2$ 22R1	17. $67 \div 4$ 16R3	18. $59 \div 3$ 19R2	19. $498 \div 7$ 71R1	20. $257 \div 5$ 51R2
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Using the Exercises

- Questions 1 to 5 give practice dividing two-digit numbers by one-digit numbers with remainders, where the first digit(s) is (are) a multiple of the divisor.
- Questions 6 to 10 give hints to the first cycle and give practice in a remainder after the first cycle.
- Students should show mastery of the objective before proceeding with questions 11 to 15.
- In questions 16 to 20, the students are required to set up the vertical form of division (or work mentally). Check that they are doing it properly before assigning the practice.

PRACTICE

Find the quotient.

1. $3 \overline{)34}$ $11R1$
2. $5 \overline{)64}$ $12R4$
3. $6 \overline{)65}$ $10R5$
4. $8 \overline{)99}$ $12R3$
5. $6 \overline{)80}$ $13R2$
6. $7 \overline{)78}$ $11R1$
7. $2 \overline{)69}$ $34R1$
8. $4 \overline{)59}$ $14R3$
9. $6 \overline{)82}$ $13R4$
10. $5 \overline{)82}$ $16R2$
11. $6 \overline{)128}$ $21R2$
12. $2 \overline{)43}$ $21R1$
13. $4 \overline{)168}$ 42
14. $6 \overline{)83}$ $13R5$
15. $3 \overline{)277}$ $92R1$

Divide. Check your answer.

16. $81 \div 2$ $40R1$
17. $79 \div 7$ $11R2$
18. $89 \div 3$ $29R2$
19. $81 \div 7$ $11R4$
20. $77 \div 4$ $19R1$
21. $75 \div 3$ 25
22. $63 \div 2$ $31R1$
23. $85 \div 4$ $21R1$
24. $68 \div 3$ $22R2$
25. $99 \div 8$ $12R3$

Write a division fact for each multiplication fact.

26. $17 \times 3 = 51$ $51 \div 3 = 17$
27. $15 \times 5 = 75$ $75 \div 5 = 15$
28. $18 \times 4 = 72$ $72 \div 4 = 18$

Find the missing factor.

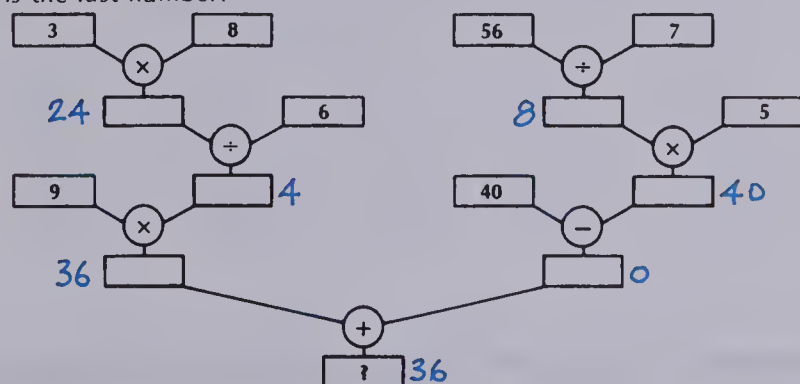
29. $\blacksquare \times 3 = 87$ 29
30. $\blacksquare \times 4 = 60$ 15
31. $\blacksquare \times 5 = 65$ 13

Solve.

32. Ninety-six people sat at eight tables at a party. How many people per table was that? 12

Math Hopscotch

What is the last number?



79

Assigning the Practice

Minimum: 1-10, 16-20, 32

Average: 6-20, 26-32

Enriched: 16-32

Reinforcement

1. Have students choose any number between 90 and 99. They are to divide it by 2, 3, 4, 5, 6, 7, 8, and 9. This gives them 8 different questions using the same 2-digit numeral. Allow students to model the questions using place-value blocks.

2. Some students may need practice with the vertical alignment of the division algorithm. A worksheet with vertical lines may help these students.

$$\begin{array}{r} 4 \overline{)94} \end{array}$$

Enrichment

1. Assign *Hopscotch*, page 79.

2. Give questions involving missing digits in the division algorithm.

For example:

$$\begin{array}{r} 34 \\ \blacksquare \overline{)1\blacksquare\blacksquare} \\ -12 \\ \hline \blacksquare\blacksquare \\ -\blacksquare\blacksquare \\ \hline 0 \end{array}$$

$$\begin{array}{r} \blacksquare 4 \\ \blacksquare \overline{)\blacksquare\blacksquare} \\ -6 \\ \hline \blacksquare\blacksquare \\ -24 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 4\blacksquare \\ 3 \overline{)\blacksquare\blacksquare\blacksquare} \\ -\blacksquare\blacksquare \\ \hline \blacksquare\blacksquare \\ -12 \\ \hline \blacksquare \end{array}$$

$$\begin{array}{r} \blacksquare\blacksquare \\ 7 \overline{)\blacksquare\blacksquare\blacksquare} \\ -56 \\ \hline 61 \\ -\blacksquare\blacksquare \\ \hline 5 \end{array}$$

Extra Practice

Divide and check.

1. $2 \overline{)27}$ $13R1$
2. $3 \overline{)45}$ 15
3. $4 \overline{)62}$ $15R2$
4. $5 \overline{)81}$ $16R1$
5. $6 \overline{)92}$ $15R2$
6. $8 \overline{)91}$ $11R3$
7. $9 \overline{)97}$ $10R7$
8. $7 \overline{)84}$ 12
9. $3 \overline{)92}$ $30R2$
10. $4 \overline{)90}$ $22R2$
11. $2 \overline{)86}$ 43
12. $5 \overline{)74}$ $14R4$
13. $6 \overline{)87}$ $14R3$
14. $7 \overline{)95}$ $13R4$
15. $2 \overline{)58}$ 29

Solve.

16. Ajax Foods buys flour in 90 kg bags and repacks it in 5 kg bags. How many of the smaller bags can be packed with the flour from one large bag? 18 bags
17. A company puts 4 cookies in a snack pack. How many snack packs can be made with 92 cookies? 23 packs

Worksheet A20

Pages 78-79

Objective A21

Divide a three-digit dividend by a one-digit divisor (two EMS cycles), with remainders.

Introducing the Lesson

Discuss the meanings of division and show by examples that division solves two types of problems.

8 objects
2 groups
How many in each group?

8 objects
2 in each group
How many groups?

Review the checking routine for division.

$$\begin{array}{r} 19R1 \\ 2 \overline{)39} \\ -2 \\ \hline 19 \\ -18 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 19 \leftarrow \text{quotient} \\ \times 2 \leftarrow \text{divisor} \\ \hline 38 \\ + 1 \leftarrow \text{remainder} \\ \hline 39 \leftarrow \text{dividend} \end{array}$$

Do several examples as this will reinforce division skills from the previous lesson.

Teaching the Lesson

The division routine for this lesson is an extension of the routine used in Lesson 3. In this case, the first two digits of the dividend are used as the number of tens for the first EMS cycle. Point out that when the first digit of the dividend is less than the divisor, the first two digits are used together as the number of tens.

$$4 \overline{)125} \quad 12 \text{ tens} \div 4$$

$$4 \overline{)232} \quad 23 \text{ tens} \div 4$$

The division is then accomplished by two applications of the EMS cycle as in the previous lesson. Discuss the placement of the numbers in the quotient (12 tens \div 4 = 3 tens, so the 3 should be put in the tens place, etc.).

Read the problem and work through the lesson example using place-value blocks.

Two-Stage Division

A bakery makes loaves of rye bread 136 cm long. Each loaf is sliced into 9 equal portions. About how long is each portion?



Divide 13 tens by 9.	Remember the ones.	Divide.	Write the remainder.
$9 \overline{)136}$	$9 \overline{)136}$ -9 46	$9 \overline{)136}$ -9 46 -45 1	$15R1$ $9 \overline{)136}$ -9 46 -45 1

Each portion is about 15 cm long.

EXERCISES

Copy and complete the division.

1. $3 \overline{)187}$ -18 07 $66R4$ $6 \overline{)664}$	2. $4 \overline{)289}$ -28 09 $73R2$ $7 \overline{)732}$	3. $5 \overline{)413}$ -40 13 $90R6$ $9 \overline{)906}$	4. $6 \overline{)503}$ -48 23 $96R3$ $9 \overline{)963}$	5. $7 \overline{)666}$ -63 36 $56R1$ $5 \overline{)561}$
6. $6 \overline{)400}$ $60R2$	7. $7 \overline{)513}$ $40R4$	8. $8 \overline{)726}$ $43R1$	9. $9 \overline{)867}$ $66R2$	10. $5 \overline{)281}$ $85R5$
11. $8 \overline{)482}$	12. $9 \overline{)364}$	13. $5 \overline{)216}$	14. $3 \overline{)200}$	15. $7 \overline{)600}$

Divide. Check your answer

16. $167 \div 4$	17. $353 \div 5$	18. $700 \div 9$	19. $201 \div 6$	20. $555 \div 8$
$4 \overline{)167}$	$7 \overline{)353}$	$77 \overline{)700}$	$33 \overline{)201}$	$69 \overline{)555}$

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Using the Exercises

- Questions 1 to 10 give practice with hints given for the first cycle.
- Questions 11 to 15 should be mastered before proceeding.
- Questions 16 to 20 require the students to set up the vertical form (or work mentally).

PRACTICE

Find the quotient.

1. $3 \overline{)127}$ $42R1$
2. $4 \overline{)246}$ $61R2$
3. $5 \overline{)371}$ $74R1$
4. $6 \overline{)342}$ 57
5. $7 \overline{)500}$ $71R3$
6. $7 \overline{)255}$ $36R3$
7. $6 \overline{)548}$ $91R2$
8. $7 \overline{)429}$ $61R2$
9. $8 \overline{)752}$ 94
10. $9 \overline{)849}$ $94R3$
11. $4 \overline{)298}$ $74R2$
12. $4 \overline{)358}$ $89R2$
13. $6 \overline{)186}$ 31
14. $7 \overline{)306}$ $43R5$
15. $8 \overline{)649}$ $81R1$

Divide. Check your answer.

16. $5 \overline{)406}$ $81R1$
17. $6 \overline{)490}$ $81R4$
18. $7 \overline{)299}$ $42R5$
19. $8 \overline{)548}$ $68R4$
20. $9 \overline{)870}$ $96R6$

Write a division question for each checking statement.

21. $6 \times 70 + 5 = 425$ $425 \div 6 = 70R5$
22. $7 \times 82 + 4 = 578$ $578 \div 7 = 82R4$
23. $8 \times 86 + 3 = 691$ $691 \div 8 = 86R3$

Solve.

24. A bakery packs 6 rolls in each plastic bag. How many full bags can be packed with 328 freshly baked rolls? 54
25. A bakery can make 174 cakes at a time in 3 ovens the same size. How many cakes are in each oven? 58

REVIEW

- | | Divide. |
|-----|---|
| A18 | 1. $9 \overline{)75}$ $8R3$ 2. $4 \overline{)19}$ $4R3$ 3. $62 \div 7$ $8R6$ 4. $49 \div 6$ $8R1$ |
| A19 | 5. $4 \overline{)83}$ $20R3$ 6. $4 \overline{)362}$ $90R2$ 7. $91 \div 3$ $30R1$ 8. $495 \div 7$ $70R5$ |
| A20 | 9. $2 \overline{)89}$ $44R1$ 10. $8 \overline{)97}$ $12R1$ 11. $45 \div 3$ 15 12. $78 \div 5$ $15R3$ |
| A21 | 13. $3 \overline{)249}$ 83 14. $4 \overline{)317}$ $79R1$ 15. $619 \div 8$ $77R3$ 16. $375 \div 9$ $41R6$ |

81

Assigning the Practice

Minimum: 1-10, 16-20, 24

Average: 6-24

Enriched: 11-25

Review Exercises

Questions	Objectives	Pages
1-4	A18	74-75
5-8	A19	76-77
9-12	A20	78-79
13-16	A21	80-81

Reinforcement

1. Students can model the questions in the practice section using place-value blocks.

2. Students can work in pairs. One student models a division question with the blocks. The other has to write out the complete division question being modelled.

Enrichment

Divide 349 by 7.

$$\begin{array}{r} 49R6 \\ 7 \overline{)349} \end{array}$$

Rearrange the dividend so that there will be no remainder.

$$\begin{array}{r} 52 \\ 7 \overline{)364} \end{array}$$

Answer:

The 9 was turned upside down and placed between the 3 and 4.

Extra Practice

Worksheet A21

Pages 80-81

Divide and check.

1. $2 \overline{)187}$ $93R1$
2. $3 \overline{)279}$ 93
3. $4 \overline{)365}$ $91R1$
4. $5 \overline{)375}$ 75
5. $7 \overline{)648}$ $92R4$
6. $8 \overline{)709}$ $88R5$
7. $6 \overline{)547}$ $91R1$
8. $8 \overline{)784}$ 98
9. $9 \overline{)832}$ $92R4$
10. $4 \overline{)252}$ 63
11. $2 \overline{)173}$ $86R1$
12. $7 \overline{)429}$ $61R2$
13. $3 \overline{)225}$ 75
14. $5 \overline{)473}$ $94R3$
15. $6 \overline{)493}$ $82R1$

Solve.

16. A grocery store has 328 oranges to be put in packages of 6. How many packages will there be? How many oranges will be left over? $54R4$
17. Joanne and Miriam drew a hopscotch court 217 cm long. The court was 7 equal sections long. How long was each section? 31 cm

Objective A22

Divide a three-digit dividend by a one-digit divisor (three EMS cycles), with remainders.

Introducing the Lesson

Review division by discussing the steps used.

Estimate. (Count and come as close as you can to the number needed.)

Multiply.

Subtract.

Bring down and start again.

Teaching the Lesson

Work through several examples with the students, showing them that the work here is merely an extension of the work done before. Each exercise requires three applications of the EMS cycle.

1. Divide hundreds, multiply, and subtract.

2. Regroup tens. Divide tens, multiply, and subtract.

3. Regroup ones. Divide ones, multiply, and subtract.

Model the examples with place-value blocks as discussed in the Introduction to this unit.

$$\begin{array}{r} 324 \\ 3 \overline{)972} \\ \underline{-9} \downarrow \\ 07 \\ \underline{-6} \downarrow \\ 12 \\ \underline{-12} \\ 0 \end{array} \quad \begin{array}{r} 171R1 \\ 4 \overline{)685} \\ \underline{-4} \downarrow \\ 28 \\ \underline{-28} \downarrow \\ 05 \\ \underline{-4} \\ 1 \end{array}$$

Call attention to the placement of the digits in the quotient (9 hundreds $\div 3 = 3$ hundreds; 7 tens $\div 3 = 2$ tens, and so on). Work through the lesson example together.

Three-Stage Division

Eva wants to make this celery salad for one person instead of four. How much celery does she need?

Celery Salad
(4 servings)

725 g celery
0.5 L water
30 mL sugar
15 mL salt
75 mL vinegar



Divide
7 hundreds by 4.

$$\begin{array}{r} 1 \\ 4 \overline{)725} \\ \underline{-4} \\ 3 \end{array}$$

Divide.

$$\begin{array}{r} 18 \\ 4 \overline{)725} \\ \underline{-4} \downarrow \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

Divide.

$$\begin{array}{r} 181 \\ 4 \overline{)725} \\ \underline{-4} \downarrow \\ 32 \\ \underline{-32} \downarrow \\ 05 \\ \underline{-4} \\ 1 \end{array}$$

Write the remainder.

$$\begin{array}{r} 181R1 \\ 4 \overline{)725} \\ \underline{-4} \\ 32 \\ \underline{-32} \\ 05 \\ \underline{-4} \\ 1 \end{array}$$

She needs about 181 g of celery.

EXERCISES

Copy and complete the division.

1. $3 \overline{)467}$ $\underline{-3}$ 16 $\underline{-15}$ 17 $\underline{13R4}$ 1R	2. $4 \overline{)558}$ $\underline{-4}$ 15 $\underline{-12}$ 38 $\underline{14R1}$ 1R	3. $5 \overline{)713}$ $\underline{-5}$ 21 $\underline{-20}$ 13 $\underline{13R2}$ 1R	4. $6 \overline{)778}$ $\underline{-6}$ 17 $\underline{-12}$ 58 $\underline{11R1}$ 1R	5. $7 \overline{)800}$ $\underline{-7}$ 10 $\underline{-7}$ 30 $\underline{29R0}$ 2R
6. $5 \overline{)669}$ $\underline{36R1}$	7. $6 \overline{)853}$ $\underline{288}$	8. $7 \overline{)975}$ $\underline{231R3}$	9. $8 \overline{)905}$ $\underline{135R4}$	10. $3 \overline{)888}$ $\underline{147R2}$
11. $2 \overline{)737}$	12. $3 \overline{)864}$	13. $4 \overline{)927}$	14. $5 \overline{)679}$	15. $6 \overline{)884}$

Divide. Check your answer.

16. $795 \div 3$	17. $957 \div 2$	18. $998 \div 4$	19. $753 \div 5$	20. $919 \div 2$
265	478R1	249R2	150R3	459R1

82

Using the Exercises

- Questions 1 to 5 give students help with the first two cycles.
- Questions 6 to 10 give help with the first cycle.
- Questions 11 to 15 should be mastered before continuing.
- In questions 16 to 20, students must set up the vertical form themselves. Watch for problems with the alignment of place values.

PRACTICE

Find the quotient.

1. $2 \overline{)999}$ $499R1$
2. $3 \overline{)745}$ $248R1$
3. $4 \overline{)951}$ $237R3$
4. $6 \overline{)675}$ $112R3$
5. $7 \overline{)987}$ 141
6. $5 \overline{)661}$ $132R1$
7. $6 \overline{)888}$ 148
8. $8 \overline{)913}$ $114R1$
9. $7 \overline{)802}$ $114R4$
10. $5 \overline{)871}$ $174R1$
11. $7 \overline{)918}$ $131R1$
12. $6 \overline{)769}$ $128R1$
13. $3 \overline{)658}$ $219R1$
14. $3 \overline{)862}$ $287R1$
15. $8 \overline{)999}$ $124R7$

Divide. Check your answer.

16. $311 \div 2$ $155R1$
17. $537 \div 4$ $134R1$
18. $831 \div 5$ $166R1$
19. $729 \div 3$ 243
20. $533 \div 2$ $266R1$

Write a division fact for each multiplication fact.

21. $312 \times 3 = 936$ $936 \div 3 = 312$
22. $457 \times 2 = 914$ $914 \div 2 = 457$
23. $158 \times 5 = 790$ $790 \div 5 = 158$

Find the missing factor.

24. $\blacksquare \times 2 = 778$ 389
25. $3 \times \blacksquare = 441$ 147
26. $\blacksquare \times 5 = 990$ 198

Solve.

27. A recipe that makes 3 servings calls for 327 g carrots and 360 g flour. How much of each is needed for one serving? $109\text{ g carrots}; 120\text{ g flour}$
28. A recipe that makes 6 servings calls for 750 mL milk and 930 g beef. How much of each is needed for one serving? $125\text{ mL milk}; 155\text{ g beef}$

Letter Logic

What digit does each letter stand for? Each different letter stands for a different digit.

$$\begin{array}{r} \text{QRS} \\ \text{R} \overline{) \text{RSQ}} \\ - \text{R} \\ \hline \text{TS} \\ - \text{U} \\ \hline \text{QQ} \\ - \text{QT} \\ \hline \text{Q} \end{array}$$

$$\begin{array}{r} \text{Check: } \text{QRS} \\ \times \text{R} \\ \hline \text{RST} \\ + \text{Q} \\ \hline \text{RSQ} \end{array}$$

$$\begin{array}{l} \text{Q} = 1 \quad \text{R} = 2 \quad \text{S} = 5 \\ \text{T} = 0 \quad \text{U} = 4 \end{array}$$

83

Assigning the Practice

Minimum: 1-8, 16-18, 27

Average: 8-27

Enriched: 11-28

Reinforcement

Have students model the Practice questions 1 to 15 using place-value blocks or money (dollars, dimes, and pennies).

Enrichment

Assign *Letter Logic*, page 83. Ask the students to make up similar puzzles themselves and share them with the class.

Extra Practice

Divide and check.

1. $2 \overline{)426}$ 213
2. $3 \overline{)935}$ $311R2$
3. $4 \overline{)841}$ $210R1$
4. $5 \overline{)596}$ $119R1$
5. $6 \overline{)777}$ $129R3$
6. $7 \overline{)833}$ 119
7. $4 \overline{)765}$ $191R1$
8. $6 \overline{)804}$ 134
9. $7 \overline{)900}$ $128R4$
10. $5 \overline{)715}$ 143
11. $3 \overline{)747}$ 249
12. $2 \overline{)589}$ $294R1$
13. $7 \overline{)925}$ $132R1$
14. $6 \overline{)678}$ 113
15. $8 \overline{)923}$ $115R3$

Solve.

16. A total of 875 people came to see the Little Eagles' 5 home games. About the same number of people came to each game. About how many people came to each game? 175 people

Worksheet A22

Pages 82-83

Objective A23

Divide a four-digit dividend by a one-digit divisor (three EMS cycles), with remainders.

Introducing the Lesson

Review with students the number of hundreds in the following numerals:

672 1340 5821 6053

Use place-value blocks to model the numbers. Trade in the thousands blocks for hundreds to show the number of hundreds.

Teaching the Lesson

Put the following exercise on the chalkboard.

$$4 \overline{)1312}$$

Ask what the first digit of the quotient will be (3). Ask what place it will go in (hundreds). Remind students that when the first digit of the quotient is less than the divisor, **the first two digits** are divided. In the exercise above, the two digits, 13, represent 13 hundreds.

$$13 \text{ hundreds} \div 4 = 3 \text{ hundreds} \\ (\text{with } 1 \text{ left over})$$

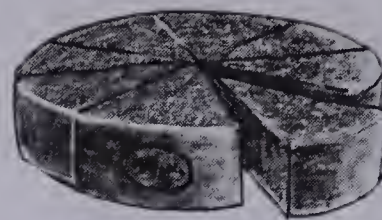
The first digit of the quotient is in the hundreds place. Do several more examples with the students, using place-value blocks if necessary.

$$5 \overline{)4675} \quad 2 \overline{)1135} \quad 3 \overline{)2476}$$

Read the problem at the top of page 84 and work through the lesson example together.

Three-Stage Division

A cheese company makes a 5453 g round of cheddar cheese. The round is cut into 8 equal wedges before it is sold. What is the approximate mass of each wedge?



Divide

54 hundreds by 8

Divide.

Divide.

Write the remainder.

$$\begin{array}{r} 6 \\ 8 \overline{)5453} \\ \underline{-48} \\ 6 \end{array}$$

$$\begin{array}{r} 68 \\ 8 \overline{)5453} \\ \underline{-48} \\ 65 \\ \underline{-64} \\ 1 \end{array}$$

$$\begin{array}{r} 681 \\ 8 \overline{)5453} \\ \underline{-48} \\ 65 \\ \underline{-64} \\ 13 \\ \underline{-8} \\ 5 \end{array}$$

$$\begin{array}{r} 681R5 \\ 8 \overline{)5453} \\ \underline{-48} \\ 65 \\ \underline{-64} \\ 13 \\ \underline{-8} \\ 5 \end{array}$$

The mass of each wedge is about 681 g

EXERCISES

Copy and complete the division.

$$\begin{array}{r} 55 \square R \square \\ 3 \overline{)1655} \\ \underline{-15} \\ 15 \\ \underline{-15} \\ 05 \end{array}$$

$$\begin{array}{r} 57 \square R \square \\ 4 \overline{)2305} \\ \underline{-20} \\ 30 \\ \underline{-28} \\ 25 \end{array}$$

$$\begin{array}{r} 55 \square R \square \\ 5 \overline{)2781} \\ \underline{-25} \\ 28 \\ \underline{-25} \\ 31 \end{array}$$

$$\begin{array}{r} 69 \square \\ 6 \overline{)4146} \\ \underline{-36} \\ 54 \\ \underline{-54} \\ 06 \end{array}$$

$$\begin{array}{r} 934R4 \\ 9 \square R \square \\ 5 \overline{)4674} \\ \underline{-45} \\ 24 \end{array}$$

$$\begin{array}{r} 897R5 \\ 8 \square R \square \\ 6 \overline{)5387} \\ \underline{-48} \\ 58 \end{array}$$

$$\begin{array}{r} 878R6 \\ 8 \square R \square \\ 7 \overline{)6152} \\ \underline{-56} \\ 55 \end{array}$$

$$\begin{array}{r} 884R1 \\ 8 \square R \square \\ 8 \overline{)7089} \\ \underline{-64} \\ 68 \end{array}$$

$$\begin{array}{r} 515R2 \\ 6 \overline{)3092} \\ \underline{-30} \\ 92 \end{array}$$

$$\begin{array}{r} 425 \\ 4 \overline{)1700} \\ \underline{-16} \\ 20 \end{array}$$

$$\begin{array}{r} 839R1 \\ 9 \overline{)7552} \\ \underline{-72} \\ 352 \end{array}$$

$$\begin{array}{r} 512R3 \\ 8 \overline{)4099} \\ \underline{-40} \\ 99 \end{array}$$

Divide. Check your answer.

13. $4267 \div 6$

14. $3695 \div 5$

15. $2000 \div 3$

16. $5543 \div 4$

84

711R1

739

666R2

1385R3

Using the Exercises

- Questions 1 to 4 have the first two cycles worked out.
- Questions 5 to 8 give help with the first cycle.
- Questions 9 to 12 should be mastered before proceeding.
- Questions 13 to 16 require the setting up of the vertical form. Watch for alignment problems and correct them before assigning the practice.

PRACTICE

Find the quotient.

1. $2 \overline{)1246}$ **623**
2. $3 \overline{)2467}$ **822 R1**
3. $3 \overline{)2352}$ **784**
4. $3 \overline{)2300}$ **766 R2**
5. $6 \overline{)5386}$ **897 R4**
6. $5 \overline{)3552}$ **710 R2**
7. $7 \overline{)4600}$ **657 R1**
8. $8 \overline{)6489}$ **811 R1**
9. $9 \overline{)3700}$ **411 R1**
10. $7 \overline{)5684}$ **812**
11. $7 \overline{)3000}$ **428 R4**
12. $9 \overline{)6578}$ **730 R8**

Divide. Check your answer.

13. $6 \overline{)5600}$ **933 R2**
14. $5 \overline{)3319}$ **663 R4**
15. $4 \overline{)1928}$ **482**
16. $9 \overline{)4000}$ **444 R4**

Write a division question for each checking statement.

17. $5 \times 817 + 2 = 4087$
 $4087 \div 5 = 817 R2$
18. $6 \times 716 + 3 = 4299$
 $4299 \div 6 = 716 R3$
19. $9 \times 785 + 7 = 7072$
 $7072 \div 9 = 785 R7$
20. $3 \times 818 + 2 = 2456$
 $2456 \div 3 = 818 R2$

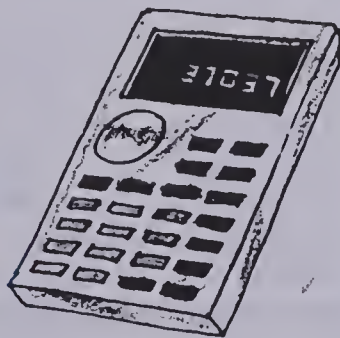
Solve.

21. The cheese company ships out the same amount of cheese 6 days a week. Last week 5676 cases were shipped. How many cases were shipped each day? **946**
22. Small wedges of Swiss cheese are specially wrapped for gift boxes. Eight wedges are put in each box. If the company has 3400 wedges, how many gift boxes can be made up? **425**

USING THE CALCULATOR

Use a calculator to complete each equation. Notice the pattern that forms.

- A. $0\ 999\ 999 \div 9 = \blacksquare \div 3 = \blacksquare$ **37 037**
- B. $1\ 999\ 998 \div 9 = \blacksquare \div 6 = \blacksquare$ **37 037**
- C. $2\ 999\ 997 \div 9 = \blacksquare \div 9 = \blacksquare$ **37 037**
- D. $3\ 999\ 996 \div 9 = \blacksquare \div 12 = \blacksquare$ **37 037**
- E. $4\ 999\ 995 \div 9 = \blacksquare \div 15 = \blacksquare$ **37 037**
- F. $5\ 999\ 994 \div 9 = \blacksquare \div 18 = \blacksquare$ **37 037**



85

Assigning the Practice

Minimum: 1-16

Average: 5-22

Enriched: 9-22

Reinforcement

Make up four-digit numerals. Divide them by a number one more than the value of the thousands, e.g., $4638 \div 5$. Do several such examples.

Enrichment

1. Assign *Using the Calculator*, page 85. Ask students to use the calculator to investigate why the pattern develops. (The first dividend and the last divisor are multiplied by the same number. So the first quotient, 37 037, always stays the same.) Challenge them to continue the pattern.
2. Try making up problems using division. Pick a common theme, e.g., a bakery. Place problems at a centre to be shared with the class.

Extra Practice

Divide and check.

1. $2 \overline{)1469}$ **734 R1**
2. $3 \overline{)2169}$ **723**
3. $4 \overline{)2485}$ **621 R1**
4. $4 \overline{)3267}$ **816 R3**
5. $5 \overline{)4575}$ **915**
6. $6 \overline{)4979}$ **829 R5**
7. $6 \overline{)5523}$ **920 R3**
8. $7 \overline{)5166}$ **738**
9. $8 \overline{)7911}$ **988 R7**
10. $3 \overline{)2531}$ **843 R2**
11. $4 \overline{)3451}$ **862 R3**
12. $5 \overline{)4270}$ **854**

Solve.

13. There are 3600 seconds in an hour. A worker at the Cookie Factory can decorate a cookie in 5 seconds. How many cookies can he decorate in an hour? **720**
14. Gum International puts 8 sticks of gum in a package. How many packages can be made with 2649 sticks of gum? How many sticks will be left over? **331 R1**

Worksheet A23

Pages 84-85

Objective A24

Divide a four-digit dividend by a one-digit divisor (four EMS cycles), with remainders.

Introducing the Lesson

Review the division process.

Discuss the steps.

Estimate. (Come as close as you can.)

Multiply.

Subtract.

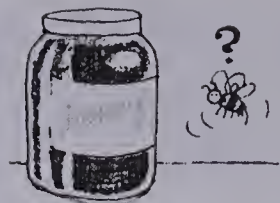
Teaching the Lesson

The division in this lesson is an extension of the routine used before; four EMS cycles are needed to arrive at the quotient. Show these division questions.

$\begin{array}{r} 1 \\ 5 \overline{)9} \\ -5 \\ \hline 4 \end{array}$	$\begin{array}{r} 18 \\ 5 \overline{)90} \\ -5 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$	$\begin{array}{r} 181 \\ 5 \overline{)907} \\ -5 \\ \hline 40 \\ -40 \\ \hline 07 \\ -5 \\ \hline 2 \end{array}$
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Four-Stage Division

Mr. Zimmer bottled 9072 g of honey he had processed from his bee hives. He put the honey in equal amounts in 5 jars. About how much honey was in each jar?



Divide

9 thousands by 5. Divide.

$$\begin{array}{r} 1 \\ 5 \overline{)9072} \\ -5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 18 \\ 5 \overline{)9072} \\ -5 \\ \hline 40 \\ -40 \\ \hline 0 \end{array}$$

Divide.

$$\begin{array}{r} 181 \\ 5 \overline{)9072} \\ -5 \\ \hline 40 \\ -40 \\ \hline 07 \\ -5 \\ \hline 2 \end{array}$$

Divide.

$$\begin{array}{r} 1814 \\ 5 \overline{)9072} \\ -5 \\ \hline 40 \\ -40 \\ \hline 07 \\ -5 \\ \hline 22 \\ -20 \\ \hline 2 \end{array}$$

Write the remainder.

$$\begin{array}{r} 1814R2 \\ 5 \overline{)9072} \\ -5 \\ \hline 40 \\ -40 \\ \hline 07 \\ -5 \\ \hline 22 \\ -20 \\ \hline 2 \end{array}$$

About 1814 g of honey were in each jar.

EXERCISES

Copy and complete the division.

$\begin{array}{r} 115 \square R \square \\ 3 \overline{)3460} \\ -3 \\ \hline 04 \\ -3 \\ \hline 16 \end{array}$	$\begin{array}{r} 146 \square R \square \\ 4 \overline{)5873} \\ -4 \\ \hline 18 \\ -16 \\ \hline 27 \end{array}$	$\begin{array}{r} 122 \square R \square \\ 5 \overline{)6137} \\ -5 \\ \hline 11 \\ -10 \\ \hline 13 \end{array}$	$\begin{array}{r} 133 \square R \square \\ 6 \overline{)7989} \\ -6 \\ \hline 19 \\ -18 \\ \hline 18 \end{array}$
$\begin{array}{r} 1 \square \square \square R \square \\ 5 \overline{)8738} \\ 1747R3 \end{array}$	$\begin{array}{r} 1 \square \square \square \\ 6 \overline{)9870} \\ 1645 \end{array}$	$\begin{array}{r} 1 \square \square \square R \square \\ 7 \overline{)9071} \\ 1295R6 \end{array}$	$\begin{array}{r} 1 \square \square \square R \square \\ 8 \overline{)8975} \\ 1121R7 \end{array}$

Divide. Check your answer.

9. $7548 \div 6$	10. $9378 \div 5$	11. $4947 \div 2$	12. $6835 \div 3$
1258	$1875R3$	$2473R1$	$2278R1$

86

Using the Exercises

- Questions 1 to 4 require students to complete the third cycle and do the fourth cycle.
- Questions 5 to 8 give help with the first cycle.
- Questions 9 to 12 must be set up in vertical form. Make sure they are being done correctly before assigning the practice.

PRACTICE

Find the quotient.

- | | | | |
|-------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|
| 1. $2 \overline{)7457}$
$3728R1$ | 2. $3 \overline{)3161}$
$1053R2$ | 3. $5 \overline{)8463}$
$1692R3$ | 4. $4 \overline{)5578}$
$1394R2$ |
| 5. $2 \overline{)8765}$
$4382R1$ | 6. $3 \overline{)6500}$
$2166R2$ | 7. $4 \overline{)4972}$
1243 | 8. $6 \overline{)6906}$
1151 |
| 9. $4 \overline{)6534}$
$1633R2$ | 10. $5 \overline{)6175}$
1235 | 11. $6 \overline{)7083}$
$1180R3$ | 12. $7 \overline{)8008}$
1144 |

Divide. Check your answer.

- | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 13. $4863 \div 2$
$2431R1$ | 14. $7553 \div 3$
$2517R2$ | 15. $5167 \div 4$
$1291R3$ | 16. $9771 \div 7$
$1395R6$ |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|

Divide each number by 3.

- | | | | |
|----------------------|------------------------|------------------------|----------------------|
| 17. 6771
2257 | 18. 5786
$1928R2$ | 19. 9547
$3182R1$ | 20. 8886
2962 |
|----------------------|------------------------|------------------------|----------------------|

Divide each number by 5.

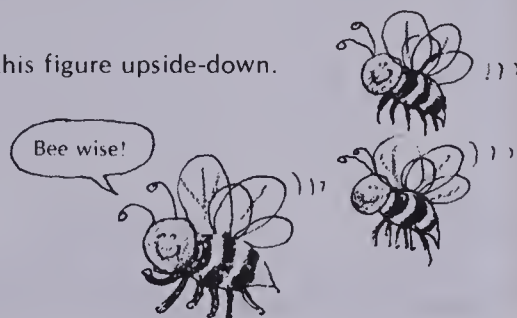
- | | | | |
|------------------------|----------------------|------------------------|----------------------|
| 21. 9633
$1926R3$ | 22. 6870
1374 | 23. 8172
$1634R2$ | 24. 9090
1818 |
|------------------------|----------------------|------------------------|----------------------|

Solve.

25. The queen bee lays nearly 9800 eggs in 5 days. How many eggs is that per day? 1960
26. Mr. Zimmer bottled 4536 g of honey in 3 jars the same size. How much honey was in each jar? 1512 g

Hexagon Hoax

Move only three hexagons to turn this figure upside-down.



87

Assigning the Practice

Minimum: 1-8, 13-14, 25

Average: 13-25

Enriched: 13-26

Reinforcement

1. Ask students to model the Practice questions using place-value blocks.

2. Choose any four-digit numeral. Divide it by any one-digit numeral. Check by multiplying. Do 5 questions.

Enrichment

1. Assign *Hexagon Hoax*, page 87. Ask students to design similar puzzles to challenge their friends.

2. Ask students to make up story problems to accompany division questions.

Extra Practice

Divide. Check the answers to the first six questions.

- | | | | |
|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| 1. $2 \overline{)6482}$
3241 | 2. $3 \overline{)6394}$
$2131R1$ | 3. $4 \overline{)4856}$
1214 | 4. $4 \overline{)8672}$
2168 |
| 5. $5 \overline{)5609}$
$1121R4$ | 6. $6 \overline{)6887}$
$1147R5$ | 7. $6 \overline{)7005}$
$1167R3$ | 8. $7 \overline{)9898}$
1414 |
| 9. $8 \overline{)9904}$
1238 | 10. $3 \overline{)7421}$
$2473R2$ | 11. $2 \overline{)9143}$
$4571R1$ | 12. $5 \overline{)7218}$
$1443R3$ |

Solve.

13. A cheese company packs slices in packages of 8. How many packages can be made with 8942 slices? How many slices will be left over? $1117R6$
14. The average-size family in Treesbank has 4 people in it. If the population of Treesbank is 5310, about how many families live there? 1327

Worksheet A24

Pages 86-87

Objective A25

Divide with zero in the quotient.

Introducing the Lesson

At the chalkboard, assign some division questions involving multiples of 10, 100, and 1000.

$$\begin{array}{r} 2 \overline{)80} \\ 2 \overline{)1200} \end{array} \quad \begin{array}{r} 4 \overline{)360} \\ 5 \overline{)1000} \end{array} \quad \begin{array}{r} 5 \overline{)250} \\ 6 \overline{)4800} \end{array}$$

Put the example $6 \overline{)0}$ on the chalkboard and ask the students to find the answer. Check the answers in the usual way. After obtaining the result:

$$\begin{array}{r} 0 \\ 6 \overline{)0} \end{array} \text{ (because } 6 \times 0 = 0\text{),}$$

try $6 \overline{)4}$ and follow the same checking procedure.

$$\begin{array}{r} 0 \\ 6 \overline{)4} \end{array} \text{ (because } 6 \times 0 + 4 = 4\text{)}$$

Do several more examples until the students are satisfied that the answers are reasonable.

Teaching the Lesson

Work through the lesson example together. It illustrates a situation in which "0" occurs in the quotient. Show it step by step.

$$\begin{array}{r} 7 \\ 3 \overline{)21} \\ \underline{-21} \\ 0 \end{array} \quad \begin{array}{r} 70 \\ 3 \overline{)212} \\ \underline{-21} \\ 2 \end{array} \quad \begin{array}{r} 70 \\ 3 \overline{)2129} \\ \underline{-21} \\ 2 \\ \underline{-0} \\ 29 \end{array} \text{ and so on.}$$

Stress that checking will detect a missing 0 in the quotient. Do several examples that involve only two EMS cycles.

$$3 \overline{)242} \quad 5 \overline{)253} \quad 8 \overline{)644}$$

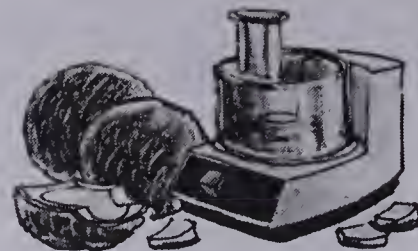
Then do examples that involve three or four EMS cycles.

$$4 \overline{)814} \quad 6 \overline{)3721} \quad 8 \overline{)960} \quad 9 \overline{)903}$$

Place-value blocks will be very useful here to emphasize that there are no tens (or hundreds or thousands) in the quotient.

Zero in the Quotient

Irene's mother made 2129 g of shredded coconut in her food processor from 3 coconuts. About how many grams did she get from each coconut?



Divide

21 hundreds
by 3.

Divide.

Divide.

Divide.

Write the
remainder.

$$\begin{array}{r} 7 \\ 3 \overline{)2129} \\ \underline{-21} \\ 0 \end{array} \quad \begin{array}{r} 70 \\ 3 \overline{)2129} \\ \underline{-21} \\ 02 \\ \underline{-0} \\ 2 \end{array} \quad \begin{array}{r} 709 \\ 3 \overline{)2129} \\ \underline{-21} \\ 02 \\ \underline{-0} \\ 29 \\ \underline{-27} \\ 2 \end{array} \quad \begin{array}{r} 709R2 \\ 3 \overline{)2129} \\ \underline{-21} \\ 02 \\ \underline{-0} \\ 29 \\ \underline{-27} \\ 2 \end{array}$$

She got about 709 g from each coconut.

EXERCISES

Copy and complete the division.

$$\begin{array}{l} 10R \blacksquare \\ 1. \quad 5 \overline{)51} \\ \underline{-5} \\ 01 \quad 10R1 \end{array} \quad \begin{array}{l} 1R \blacksquare \\ 2. \quad 3 \overline{)32} \\ \underline{-1} \\ 02 \quad 10R2 \end{array} \quad \begin{array}{l} 2R \blacksquare \\ 3. \quad 4 \overline{)829} \\ \underline{-8} \\ 02 \quad 20R1 \end{array} \quad \begin{array}{l} 1R \blacksquare \\ 4. \quad 7 \overline{)7105} \\ \underline{-7} \\ 01 \quad 10R1 \end{array}$$

$$\begin{array}{l} 20R \blacksquare \\ 5. \quad 4 \overline{)83} \\ \underline{-8} \\ 03 \quad 20R3 \end{array} \quad \begin{array}{l} 1R \blacksquare \\ 6. \quad 5 \overline{)53} \\ \underline{-5} \\ 03 \quad 10R3 \end{array} \quad \begin{array}{l} 6R \blacksquare \\ 7. \quad 7 \overline{)421} \\ \underline{-42} \\ 01 \quad 60R1 \end{array} \quad \begin{array}{l} 4R \blacksquare \\ 8. \quad 8 \overline{)3235} \\ \underline{-32} \\ 03 \quad 40R3 \end{array}$$

Divide. Check your answer.

$$9. \quad 81 \div 8 \quad 10. \quad 282 \div 7 \quad 11. \quad 4002 \div 8 \quad 12. \quad 3601 \div 4$$

88

10R1

40R2

500R2

900R1

Using the Exercises

- Questions 1 to 8 are partially worked out to help the students see where a zero is required in the quotient.
- Make sure questions 9 to 12 are done correctly before assigning the practice. Illustrate more examples, if necessary.

Find the quotient

1. $6 \overline{)65}$ $10R5$
2. $2 \overline{)483}$ $241R1$
3. $6 \overline{)651}$ $108R3$
4. $7 \overline{)8429}$ $1204R1$
5. $4 \overline{)42}$ $10R2$
6. $3 \overline{)601}$ $200R1$
7. $3 \overline{)1211}$ $403R2$
8. $5 \overline{)2003}$ $400R3$
9. $4 \overline{)83}$ $20R3$
10. $2 \overline{)810}$ 405
11. $5 \overline{)541}$ $108R1$
12. $3 \overline{)3001}$ $1000R1$

Divide. Check your answer

13. $461 \div 2$ $230R1$
14. $805 \div 8$ $100R5$
15. $7049 \div 7$ 1007
16. $6472 \div 8$ 809

Write a division question for each checking statement

17. $6 \times 408 + 4 = 2452$ $2452 \div 6 = 408R4$
18. $7 \times 1058 + 4 = 7410$ $7410 \div 7 = 1058R4$

Find the missing factor.

19. $6 \times \blacksquare = 1248$ 208
20. $9 \times \blacksquare = 936$ 104
21. $3 \times \blacksquare = 921$ 307

Solve.

22. Irene's father made 1814 g of peanut butter in the food processor. He packed it in 6 identical plastic cartons. About how many grams were in each carton? $302g$

Assigning the Practice

Minimum: 1-8, 13-14, 22

Average: 9-22

Enriched: 13-22

Reinforcement

Students should now be able to handle any division involving up to four-digit dividends and one-digit divisors. Have students make up such division questions and write them on the board for the class to do. Challenge them to make their questions as difficult as possible.

Enrichment

For *Computer Tutor*, page 89, ask the students to complete the charts and find the rule (in the first and third computers). Students may make up other number patterns and ask their friends to find the rule.

Computer Tutor

89

Extra Practice

Divide and check.

1. $3 \overline{)32}$ $10R2$
2. $4 \overline{)43}$ $10R3$
3. $5 \overline{)54}$ $10R4$
4. $6 \overline{)61}$ $10R1$
5. $5 \overline{)525}$ 105
6. $6 \overline{)724}$ $120R4$
7. $7 \overline{)1458}$ $208R2$
8. $7 \overline{)7564}$ $1080R4$
9. $8 \overline{)8847}$ $1105R7$
10. $9 \overline{)9064}$ $1007R1$
11. $5 \overline{)1513}$ $302R3$
12. $6 \overline{)6012}$ 1002

Solve.

13. A salesman earns \$515 for a 5-day week. How much does he earn per day? $\$103$
14. A dairy sells milk in 4 L packs. How many packs can be made from 424 L? 106 packs

Worksheet A25

Pages 88-89

UNIT 4

LESSON 9

Objective M3

Divide with money.

Introducing the Lesson

Discuss with students the need to know unit costs when shopping for food. Sometimes things sell in quantity, but you may need only one. For example, 3 lettuce cost 99¢, but you need only one.

Teaching the Lesson

Work through the following questions on the chalkboard.

$$\begin{array}{r} 146 \\ 3 \overline{)438} \\ \underline{-3} \\ 13 \\ \underline{-12} \\ 18 \\ \underline{-18} \\ 0 \end{array} \quad \begin{array}{r} \$1.46 \\ 3 \overline{)\$4.38} \\ \underline{-3} \\ 13 \\ \underline{-12} \\ 18 \\ \underline{-18} \\ 0 \end{array}$$

$$\begin{array}{r} 246 \\ 4 \overline{)984} \\ \underline{-8} \\ 18 \\ \underline{-16} \\ 24 \\ \underline{-24} \\ 0 \end{array} \quad \begin{array}{r} \$2.46 \\ 4 \overline{)\$9.84} \\ \underline{-8} \\ 18 \\ \underline{-16} \\ 24 \\ \underline{-24} \\ 0 \end{array}$$

Conclude that division of a money number by a one-digit divisor is like the division of a whole number by a one-digit divisor.

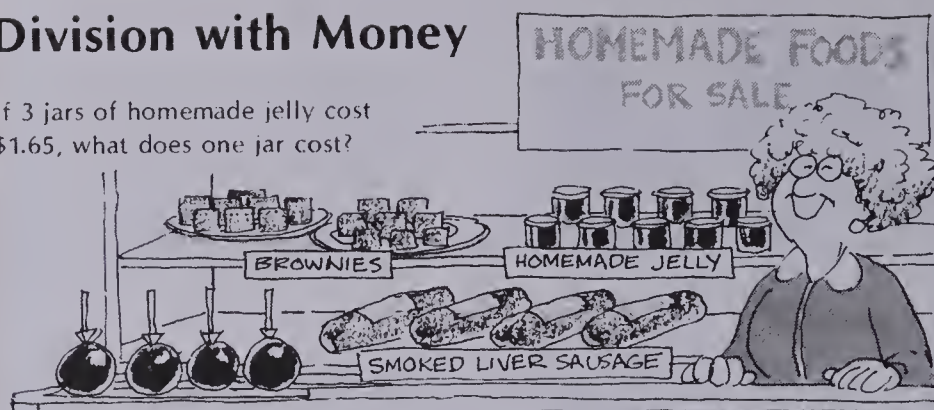
Emphasize the importance of placing the decimal point in the quotient directly above the decimal point in the dividend.

Read and work through the textbook example together.

Emphasize the checking step.

Division with Money

If 3 jars of homemade jelly cost \$1.65, what does one jar cost?



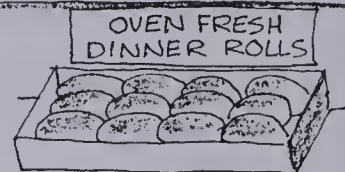
Remember the \$.

Divide.

$$\begin{array}{r} 3 \overline{) \$1.65} \end{array}$$

$$\begin{array}{r} \$ \\ 3 \overline{) \$1.65} \end{array}$$

$$\begin{array}{r} \$0.55 \\ 3 \overline{) \$1.65} \\ \underline{-15} \\ 15 \\ \underline{-15} \\ 0 \end{array}$$



$$\begin{array}{r} \text{Check: } \$0.55 \\ \times 3 \\ \hline \$1.65 \end{array}$$

One jar of jelly costs \$0.55

EXERCISES

Divide.

- | | | | |
|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 1. $3 \overline{) \$249}$ | 2. $3 \overline{) \$2.49}$ | 3. $9 \overline{) \$450}$ | 4. $9 \overline{) \$4.50}$ |
| 5. $6 \overline{) \$918}$ | 6. $6 \overline{) \$9.18}$ | 7. $5 \overline{) \$4260}$ | 8. $5 \overline{) \$42.60}$ |
| 9. $2 \overline{) \$0.86}$ | 10. $3 \overline{) \$0.39}$ | 11. $4 \overline{) \$4.16}$ | 12. $8 \overline{) \$6.64}$ |

Divide. Check your answer.

- | | | | |
|--------------------|--------------------|---------------------|----------------------|
| 13. $\$826 \div 2$ | 14. $\$105 \div 5$ | 15. $\$2.87 \div 7$ | 16. $\$15.06 \div 3$ |
|--------------------|--------------------|---------------------|----------------------|

90 \$413 \$21 \$0.41 \$5.02

Using the Exercises

- Questions 1 to 8 involve pairs of equations using the same digits, with and without decimal points. Check for proper placement of the decimal point in the odd-numbered questions.
- Check that questions 9 to 16 are done correctly before assigning the practice.

PRACTICE

Divide

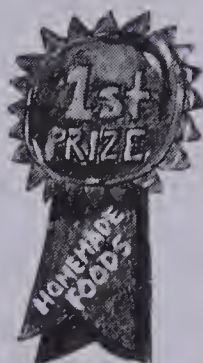
1. $8 \overline{) \$1.76}$ $\$0.22$
2. $6 \overline{) \$3.66}$ $\$0.61$
3. $4 \overline{) \$0.96}$ $\$0.24$
4. $5 \overline{) \$0.75}$ $\$0.15$
5. $6 \overline{) \$9.42}$ $\$1.57$
6. $8 \overline{) \$8.96}$ $\$1.12$
7. $3 \overline{) \$22.89}$ $\$7.63$
8. $7 \overline{) \$36.75}$ $\$5.25$

Divide. Check your answer.

9. $3 \overline{) \$13.68}$ $\$4.56$
10. $8 \overline{) \$48.40}$ $\$6.05$
11. $6 \overline{) \$8.04}$ $\$1.34$
12. $7 \overline{) \$21.49}$ $\$3.07$

Solve.

13. What is the cost of one smoked sausage, if 5 sausages are \$9.50? $\$1.90$
14. What is the cost of one brownie, if 8 brownies are 96¢? $\$0.12$
15. What is the cost of one box of peanut brittle, if 2 boxes are \$3.20? $\$1.60$
16. What is the cost of one taffy apple, if 9 apples are \$2.70? $30¢$
17. What is the cost of two dinner rolls, if 6 rolls are \$1.08? $36¢$



Consumer Problems

Which is the better buy?

- A. or $\$2.35$ is circled.
- B. or $\$5.50$ is circled.
- C. or $\$2.50$ is circled.
 either
- D. or $\$7.00$ is circled.

91

Assigning the Practice

Minimum: 1-10, 13-14

Average: 5-16

Enriched: 9-17

Reinforcement

1. Ask the students to use real money or play money to model the Practice questions.

2. Assign comparison problems. Which division has the largest quotient?

$$8 \overline{) \$6.48} \quad 4 \overline{) \$3.28} \quad 4 \overline{) \$3.64}$$

Ask the students to guess first by estimating, then to check their answers by calculating.

3. Assign *Consumer Problems*, page 91.

Enrichment

Have students collect advertisements from newspapers and magazines to demonstrate where division of money is necessary in real-life situations. The students may make up problems based on the ads and display them for the class.

Extra Practice

Divide and check.

1. $2 \overline{) \$2.50}$ $\$1.25$
2. $3 \overline{) \$6.75}$ $\$2.25$
3. $2 \overline{) \$8.30}$ $\$4.15$
4. $4 \overline{) \$4.80}$ $\$1.20$
5. $2 \overline{) \$1.24}$ $\$0.62$
6. $3 \overline{) \$1.26}$ $\$0.42$
7. $4 \overline{) \$1.28}$ $\$0.32$
8. $4 \overline{) \$2.04}$ $\$0.51$
9. $2 \overline{) \$1.44}$ $\$0.72$
10. $4 \overline{) \$12.88}$ $\$3.22$
11. $4 \overline{) \$17.56}$ $\$4.39$
12. $9 \overline{) \$8.19}$ $\$0.91$

Solve.

13. Four banana loaves cost \$2.52 to make. How much does one loaf cost? $\$0.63$
14. Tom earned \$5.25 in 3 h. How much did he earn in 1 h? $\$1.75$

Worksheet A26

Pages 90-91

Objective PS3

Solve problems involving multiplication or division.

Introducing the Lesson

Ask students to make up multiplication and division problems. As each student recites a problem, ask the others whether the problem involves multiplication or division. Ask them how they decided. Make a list of key words in their problems that indicate the operation.

Teaching the Lesson

Read problems 1 and 2. Draw attention to the fact that the same numbers are used in both problems. The big difference is in the question being asked and its context. This is what determines the choice of operation in the "Decide" step. The student must look for key words like "How many in all?" However, the decision-making process cannot be reduced to a simple algorithm. Problem solving requires reading and re-reading the situation described until it is fully understood. If necessary, diagrams can be drawn, or the problem can be acted out using suitable numbers.

Remind students that they are not finished after doing the arithmetic. The problem should be answered in sentence form.

Problem Solving

Problem 1

There are 144 cases of apple juice with 8 tins in each case. How many tins are there in all?

144 cases
8 tins in a case

Multiply.

$$\begin{array}{r} 144 \\ \times 8 \\ \hline 1152 \end{array}$$

There are 1152 tins in all.

Identify.

Decide.

Evaluate.

Answer

Problem 2

Tins of apple juice are being packed 8 to a case. If there are 144 tins of apple juice, how many cases can be packed?

8 tins to a case
144 tins

Divide.

$$\begin{array}{r} 18 \\ 8 \overline{)144} \\ \underline{-8} \\ 64 \\ \underline{-64} \\ 0 \end{array}$$

Eighteen cases can be packed

EXERCISES

Are these likely to be multiplication or division questions?

- | | |
|---|--------------------------------------|
| 1. How many in all? mult. | 2. How many in each? div. |
| 3. What does one cost? div. | 4. How much altogether? mult. |
| 5. How long is each? div. | 6. What do 9 cost? mult. |
| 7. How far in seven hours? mult. | 8. How far in one hour? div. |

Write the **Identify** and **Decide** steps.

- | | |
|---|---------------------|
| 9. If one bus ticket costs \$8, what do 48 tickets cost? | 48 \$8 mult. |
| 10. If a car goes 390 km in 6 h, how far does it go in one hour? | 390 ÷ 6 div. |
| 11. There are 25 books on each of 7 shelves. How many books are there in all? | 25 × 7 mult. |

Using the Exercises

- Questions 1 to 8 should promote some lively discussion. The wording suggests certain operations but problems can be posed for either operation.

For example, for question 7:

10 km in one hour 10 km in 14 hours

How far in 7 hours? How far in 7 hours?

Multiplication Division

If students disagree, challenge them to make up problems involving the given wording and their choice of operation.

- Questions 9 to 11 require the first two steps in the problem-solving process. After discussing the choice of operation, students may be asked to solve these problems.

PRACTICE

Solve.

- Paula ran 5 times around a 400 m track. How far did she run? **2000 m**
- Two bottles of dish detergent are \$1.82. What does one cost? **91¢**
- One avocado costs \$0.95. What do 4 cost? **\$3.80**
- If a plane travels at 665 kilometres per hour, how far can it go in 8 h? **5320 km**
- A 195 cm board is cut into 5 equal pieces. How long is each piece? **39 cm**
- How many 6-packs of cola can be made up with 372 bottles? **62 packs**
- A bread truck carries 75 trays of bread. Each tray holds 9 loaves. How much bread does it carry in all? **675 loaves**
- If 2268 g of ground beef are divided into 5 equal parts, how many grams are in two parts? **907 g**

REVIEW

A22	Divide 274 R1	219	143	124 R3
	1. $2 \overline{)549}$	2. $3 \overline{)657}$	3. $4 \overline{)572}$	4. $8 \overline{)995}$
A23	714 R4	709 R5	239	715 R6
	5. $5 \overline{)3574}$	6. $6 \overline{)4259}$	7. $9 \overline{)2151}$	8. $7 \overline{)5011}$
A24	9. $8316 \div 4$ 2079	10. $9572 \div 3$ 3190 R2	11. $8960 \div 5$ 1792	12. $6753 \div 2$ 3376 R1
A25	10 R4	206 R1	1000 R4	2026 R3
	13. $7 \overline{)74}$	14. $3 \overline{)619}$	15. $5 \overline{)5004}$	16. $4 \overline{)8107}$
M3	17. $\$5.25 \div 5$ \$1.05	18. $\$3.86 \div 2$ \$1.93	19. $\$43.72 \div 8$ \$5.46 R4	20. $\$71.05 \div 7$ \$10.15

93

Assigning the Practice

Minimum: 1-6

Average: 1-8

Enriched: 1-8

Review Exercises

Questions	Objective	Pages
1-4	A22	82-83
5-8	A23	84-85
9-12	A24	86-87
13-16	A25	88-89
17-20	M3	90-91

Reinforcement

Give students newspapers. Have them use articles dealing with sales ads to make story problems using multiplication or division. They may share their problems with the class.

Enrichment

Have the students work in groups. Make a series of story problems using a common theme, like a school picnic. Use multiplication or division questions, or both.

Extra Practice

Worksheet PS3

Pages 92-93

Solve.

- Two jars of coffee cost \$7.78. How much does one jar cost? **\$3.89**
- Tim bicycles 48 km in 3 h. How far does he bicycle in 1 h? **16 km**
- If 1 kg of ground beef costs \$5.51, how much do 3 kg cost? **\$16.53**
- Teresa swam the 50 m length of the pool 6 times. How far did she swim? **300 m**
- Eight school buses will carry 336 children to the zoo. How many children will be on each bus? **42**

Problem Solving Activities

Assign Level 5, Unit 4.

Unit 4 Objective	Test Questions	Pages
A18	1- 5	74-75
A19	6-10	76-77
A20	11-15	78-79
A21	16-20	80-81
A22	21-24	82-83
A23	25-28	84-85
A24	29-32	86-87
A25	33-36	88-89
M3	37-40	90-91
PS	41-44	

TEST

UNIT 4

Divide.

- $6 \overline{)39}$ $6R3$
- $8 \overline{)37}$ $4R5$
- $3 \overline{)25}$ $8R1$
- $7 \overline{)53}$ $7R4$
- $9 \overline{)71}$ $7R8$
- $214 \div 7$ $30R4$
- $486 \div 8$ $60R6$
- $304 \div 5$ $60R4$
- $727 \div 9$ $80R7$
- $563 \div 8$ $70R3$
- $47 \div 2$ $23R1$
- $93 \div 3$ 31
- $35 \div 2$ $17R1$
- $89 \div 7$ $12R5$
- $97 \div 6$ $16R1$
- $429 \div 5$ $85R4$
- $632 \div 8$ 79
- $115 \div 2$ $57R1$
- $413 \div 9$ $45R8$
- $265 \div 4$ $66R1$
- $4 \overline{)624}$ 156
- $5 \overline{)817}$ $163R2$
- $6 \overline{)906}$ 151
- $7 \overline{)811}$ $115R6$
- $7 \overline{)2513}$ 359
- $6 \overline{)4725}$ $787R3$
- $2 \overline{)1158}$ 579
- $8 \overline{)3359}$ $419R7$
- $2 \overline{)4792}$ 2396
- $6 \overline{)7997}$ $1332R5$
- $8 \overline{)9737}$ $1217R1$
- $5 \overline{)7435}$ 1487
- $3 \overline{)617}$ $205R2$
- $4 \overline{)809}$ $202R1$
- $5 \overline{)3504}$ $700R4$
- $2 \overline{)4001}$ $2000R1$
- $8 \overline{)\$728}$ $\$91$
- $3 \overline{)\$0.36}$ $\$0.12$
- $9 \overline{)\$5.49}$ $\$0.61$
- $3 \overline{)\$15.18}$ $\$5.06$

Solve.

- If 3 pairs of socks cost \$7.20, what does one pair cost? $\$2.40$
- Each box of tea has 150 tea bags. How many tea bags are there in 7 boxes? 1050
- Ted divided 1361 g of chili equally into 6 plastic containers. About how many grams were in each container? $227g$
- Five boxes containing a total of 245 bags of potato chips were delivered to a store. How many bags were in each box? 49

94

Post-test

Unit 4

Divide.

- $7 \overline{)44}$ $6R2$
- $6 \overline{)29}$ $4R5$
- $4 \overline{)22}$ $5R2$
- $5 \overline{)29}$ $5R4$
- $9 \overline{)80}$ $8R8$
- $7 \overline{)352}$ $50R2$
- $8 \overline{)324}$ $40R4$
- $5 \overline{)353}$ $70R3$
- $9 \overline{)632}$ $70R2$
- $4 \overline{)361}$ $90R1$
- $2 \overline{)33}$ $16R1$
- $3 \overline{)64}$ $21R1$
- $8 \overline{)169}$ $21R1$
- $7 \overline{)91}$ 13
- $6 \overline{)306}$ 51
- $5 \overline{)371}$ $74R1$
- $8 \overline{)584}$ 73
- $2 \overline{)117}$ $58R1$
- $3 \overline{)284}$ $94R2$
- $5 \overline{)572}$ $114R2$
- $4 \overline{)685}$ $171R1$
- $7 \overline{)814}$ $116R2$
- $6 \overline{)933}$ $155R3$
- $8 \overline{)914}$ $114R2$
- $9 \overline{)4734}$ 526

MULTIPLICATION

Multiply.

- | | | | | |
|---|---|--|---|---|
| 1. $\begin{array}{r} 80 \\ \times 6 \\ \hline 480 \end{array}$ | 2. $\begin{array}{r} 50 \\ \times 4 \\ \hline 200 \end{array}$ | 3. $\begin{array}{r} 53 \\ \times 2 \\ \hline 106 \end{array}$ | 4. $\begin{array}{r} 75 \\ \times 3 \\ \hline 225 \end{array}$ | 5. $\begin{array}{r} 68 \\ \times 7 \\ \hline 476 \end{array}$ |
| 6. $\begin{array}{r} 600 \\ \times 4 \\ \hline 2400 \end{array}$ | 7. $\begin{array}{r} 708 \\ \times 6 \\ \hline 4248 \end{array}$ | 8. $\begin{array}{r} 4000 \\ \times 7 \\ \hline 28\,000 \end{array}$ | 9. $\begin{array}{r} 3586 \\ \times 8 \\ \hline 28\,688 \end{array}$ | 10. $\begin{array}{r} 5709 \\ \times 5 \\ \hline 28\,545 \end{array}$ |
| 11. $\begin{array}{r} 53 \\ \times 30 \\ \hline 1590 \end{array}$ | 12. $\begin{array}{r} 72 \\ \times 90 \\ \hline 6480 \end{array}$ | 13. $\begin{array}{r} 67 \\ \times 60 \\ \hline 4020 \end{array}$ | 14. $\begin{array}{r} 41 \\ \times 13 \\ \hline 533 \end{array}$ | 15. $\begin{array}{r} 29 \\ \times 14 \\ \hline 406 \end{array}$ |
| 16. $\begin{array}{r} 86 \\ \times 19 \\ \hline 1634 \end{array}$ | 17. $\begin{array}{r} 23 \\ \times 32 \\ \hline 736 \end{array}$ | 18. $\begin{array}{r} 46 \\ \times 24 \\ \hline 1104 \end{array}$ | 19. $\begin{array}{r} 87 \\ \times 83 \\ \hline 7221 \end{array}$ | 20. $\begin{array}{r} 59 \\ \times 78 \\ \hline 4602 \end{array}$ |
| 21. $\begin{array}{r} 65¢ \\ \times 8 \\ \hline 520¢ \end{array}$ | 22. $\begin{array}{r} \$3.25 \\ \times 6 \\ \hline \$19.50 \end{array}$ | 23. $\begin{array}{r} \$12.55 \\ \times 4 \\ \hline \$50.20 \end{array}$ | 24. $\begin{array}{r} \$8.24 \\ \times 3 \\ \hline \$24.72 \end{array}$ | 25. $\begin{array}{r} \$0.15 \\ \times 43 \\ \hline \$6.45 \end{array}$ |
| 26. $\begin{array}{r} 6.2 \\ \times 3 \\ \hline 18.6 \end{array}$ | 27. $\begin{array}{r} 5.9 \\ \times 8 \\ \hline 47.2 \end{array}$ | 28. $\begin{array}{r} 76.2 \\ \times 8 \\ \hline 609.6 \end{array}$ | 29. $\begin{array}{r} 3.7 \\ \times 95 \\ \hline 351.5 \end{array}$ | 30. $\begin{array}{r} 4.8 \\ \times 56 \\ \hline 268.8 \end{array}$ |

Solve.

31. What temperature is 18°C below the boiling point of water? **82°C**
32. Twelve buses carrying 35 people each drove skiers to the nearest ski area. How many people was that in all? **420**
33. What is the cost of 4 railway tickets at \$24.95 a ticket? **\$99.80**
34. An auditorium has 95 rows of seats with 35 seats in each row. How many seats are there in all? **3325**

- | | | | | |
|---|--|--|--|---|
| 26. $\begin{array}{r} 591 \\ 2 \overline{)1182} \end{array}$ | 27. $\begin{array}{r} 563\,R6 \\ 7 \overline{)3947} \end{array}$ | 28. $\begin{array}{r} 931\,R2 \\ 3 \overline{)2795} \end{array}$ | 29. $\begin{array}{r} 2134\,R1 \\ 4 \overline{)8537} \end{array}$ | 30. $\begin{array}{r} 1186 \\ 5 \overline{)5930} \end{array}$ |
| 31. $\begin{array}{r} 4177 \\ 2 \overline{)8354} \end{array}$ | 32. $\begin{array}{r} 2121\,R3 \\ 4 \overline{)8487} \end{array}$ | 33. $\begin{array}{r} 308 \\ 3 \overline{)924} \end{array}$ | 34. $\begin{array}{r} 304 \\ 2 \overline{)608} \end{array}$ | 35. $\begin{array}{r} 103\,R3 \\ 5 \overline{)518} \end{array}$ |
| 36. $\begin{array}{r} 1090\,R8 \\ 9 \overline{)9818} \end{array}$ | 37. $\begin{array}{r} \$1.36 \\ 6 \overline{) \$8.16} \end{array}$ | 38. $\begin{array}{r} \$0.17 \\ 2 \overline{) \$0.34} \end{array}$ | 39. $\begin{array}{r} \$0.29 \\ 8 \overline{) \$2.32} \end{array}$ | 40. $\begin{array}{r} \$8.05 \\ 5 \overline{) \$40.25} \end{array}$ |

Solve.

41. Vito read 3 books. Each book had 128 pages. How many pages did he read? **384 pages**
42. If 8 stickers cost \$1.20, how much does one sticker cost? **\$0.15**
43. Anne bought 2 gliders that cost \$3.98 each. How much did the gliders cost altogether? **\$7.96**
44. The Levines drove 1522 km in 3 days on their holidays. About how far did they drive each day? **507 km**

UNIT 5

Measurement

Theme: Measuring

Lesson		Objective	Pages
Preview		Review metric units of length.	97
1	M4	Measure length using millimetres, centimetres, metres, or kilometres.	98-99
2	M5	Find the perimeter of a figure.	100-101
3	M6	Find the area of a figure by counting square units.	102-103
4	M7	Find the area of a rectangle.	104-105
5	M8	Find the volume of a rectangular prism.	106-107
6	M9	Measure capacity using litres and millilitres.	108-109
7	M10	Measure mass using grams, kilograms, and tonnes.	110-111
8	M11	Classify angles as right angles, less than right angles, or more than right angles.	112-113
9	M12	Measure angles with a protractor.	114-115
10	PS4	Choose the correct operation in problem solving.	116-117
Test		Measurement	118
Review		Division	119

About This Unit

The aim of this unit is to have the student

1. be able to choose the appropriate unit of metric measure;
2. develop skill in using measuring instruments;
3. develop skill in estimating measurement.

Measurement is not a subject that can be learned passively. Students must take an active role in the measuring process. Consequently, each lesson involves hands-on activities. Students need a great deal of experience with measuring before they truly understand the concepts and can apply them in real-life situations.

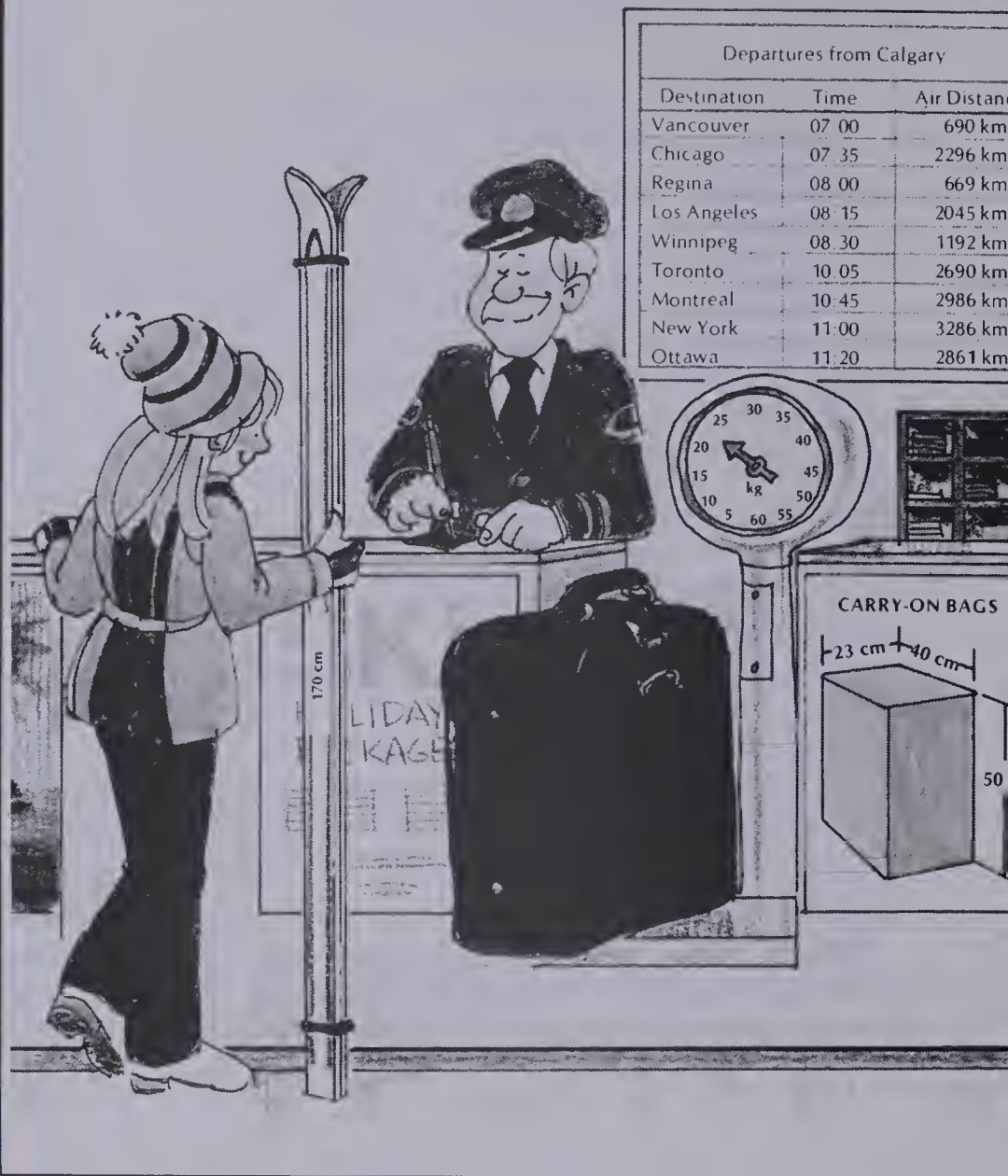
Basic computational skills previously learned are applied to each lesson's measuring situations. Many of the measurement terms will have been studied in the earlier grades, but are treated in greater depth in this unit. New at this level are the tonne (Lesson 7), the decametre (Enrichment, Lesson 1), the hectolitre (Enrichment, Lesson 6), and the decimetre cube (Enrichment, Lesson 5). The relationships among the units of capacity, mass, and length are also more thoroughly studied as the cubic centimetre and cubic decimetre are discussed.

The work of this unit will be particularly interesting and enjoyable to the students because of the many manipulatives and easy applications to real-life situations.

Ideas

1. The students' success with this unit will depend largely on their actual experiences with measuring. Hence, it is important to have these measuring materials available:
 - a. centimetre and metric rulers and tape
 - b. trundle wheel
 - c. centimetre grid paper
 - d. centimetre cubes
 - e. balance scales
 - f. graduated cylinders
 - g. protractors
2. Set aside an area in the classroom as a measurement centre. Have available various kinds of measuring instruments and suggestions for activities. Many of the activities suggested in the Enrichment and Reinforcement sections of each lesson would be suitable for the centre.
3. Involve the students in very long lengths, very small lengths, large capacities and masses, and distances through round objects. These types of items are difficult to measure from a textbook illustration, yet are an important aspect of the measurement spectrum. Trundle wheels, map distance charts, magnifying glasses, and calipers can be of great use in this regard. Inspection of postal and grocery scales also should be suggested.

UNIT 5 MEASUREMENT



Unit 5 Objective	Test Questions	Pages
M4	1-4	98-99
M5	5-6	100-101
M6	7	102-103
M7	8	104-105
M8	9-11	106-107
M9	12-13	108-109
M10	14-16	110-111
M11	17	112-113
M12	18-19	114-115
PS	20	

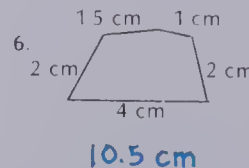
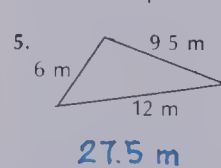
Pretest

Unit 5

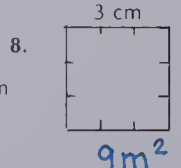
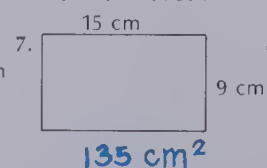
Would centimetres, metres, millimetres, or kilometres be used to measure:

- width of a train ticket cm
- length of a railroad track km
- length of a train m
- thickness of a folded map mm

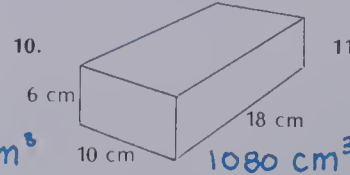
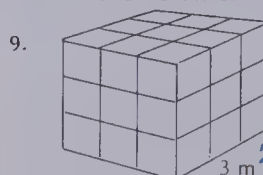
What is the perimeter?



What is the area?



What is the volume?

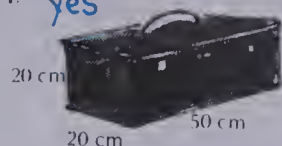


11. length = 22 m
width = 15 m
height = 16 m
5280 m³

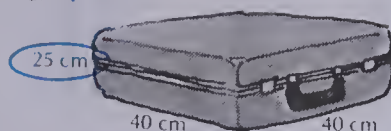
Carry-On Luggage

Can you use this case as carry-on luggage? If not, why not?

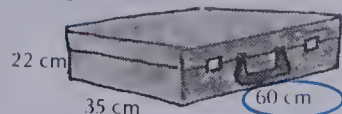
1. **yes**



2. **no**



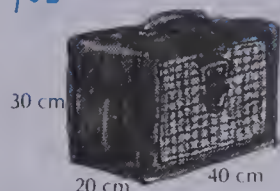
3. **no**



4. **yes**



5. **yes**



6. **no**



Copy and complete

Unit	Symbol	
millimetre	mm ■	1 m = 1000 mm ■
centimetre	cm ■	1 m = 100 cm ■
decimetre	dm ■	1 m = 10 dm ■
metre	m	
kilometre	km ■	1000 m = 1 km ■

97

UNIT 5

PREVIEW

Suggestions

Refer the class to the illustration on page 96. Ask the students to tell you all the things being measured in the picture (time, length, temperature, luggage). Discuss how important measurement is to travel.

About the Page

Before the students attempt to do the questions on page 97, review the names of the basic metric units of length and their symbols. Ask the students to name as many units of length as they can remember. Write them in order according to length in a chalkboard chart. Use the abbreviated forms.

km m dm cm mm

Explain that the metre is the basic unit of length. Have the students recall the relationship of these units to a metre with the help of a metre stick.

"How many decimetres are there on this metre stick?" *Ten. So, 1 m = 10 dm.*

"How many centimetres are there on this metre stick?" *One hundred. So, 1 m = 100 cm.*

"How many millimetres are there on this metre stick?" *One thousand. So, 1 m = 1000 mm.*

"How many metre sticks laid end-to-end would make a kilometre?" *One thousand. So, 1000 m = 1 km.*

For questions 1 to 6 the students must use the guide for carry-on luggage pictured on page 96. Since they are asked to explain why a piece of luggage is not acceptable, review the terms length, width, and height. Ask the students to identify these three dimensions on the pieces of luggage before they answer the questions.

The questions at the bottom of the page are a follow-up to the review of metric units suggested earlier.

Reinforcement

Ask the students to match:

cm	kilometre
km	metre
dm	millimetre
m	centimetre
mm	decimetre

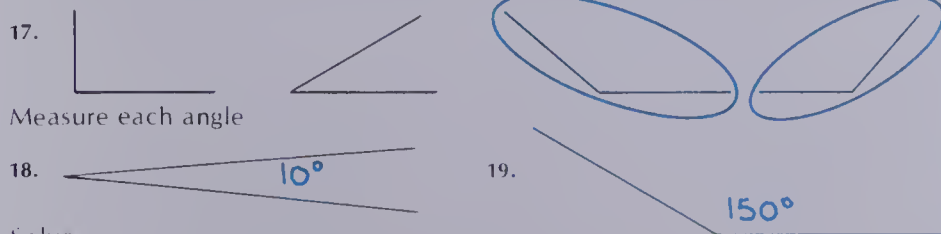
Choose the more likely capacity

12. a jar of jelly: 2 L or **250 mL** 13. a cottage pot **2 L** or 250 mL

Copy and complete

14. 3 t = **3000** kg 15. 8000 g = **8** kg 16. **4000** kg = 4 t

Circle the angles that are more than a right angle



Solve

20. What is the cost of 1 kg of cheese if 500 g is \$4.00?

\$8.00

Objective M4

Measure length using millimetres, centimetres, metres, or kilometres.

Introducing the Lesson

Ask each student to use his or her pencil as a unit of length. Ask the students to estimate the length of the chalkboard in pencil units (p). Then have them measure the length. Record the results in a chart.

	Estimate	Actual Measure
Ray	32 p	26 p
Tina	44 p	32 p
Sam	24 p	29.5 p

Discuss the reason for the variety of answers. Discuss the meaning of “p” in the chart. Does it always mean the same length? Discuss the need for standard units of measure.

Teaching the Lesson

Give small groups of students a metre stick. Review and discuss the standard metric units found on the stick referring to the top of page 98. Stress the illustrations which provide a quick reference for estimating length.

Ask the students to measure the width of their math books. “Which unit would be the best to use?” *Centimetres. It is 19 cm.* Point out that 19 cm can be expressed in millimetres as 190 mm, or 1.9 dm.

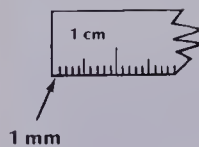
Ask the students to measure the width of their desks. Discuss the best unit of measure. Have them express their result in centimetres. Talk about how their result can also be expressed in millimetres and decimetres. For example: 75 cm wide or 750 mm or 7.5 dm.

Ask the students to measure the width of the chalkboard in metres. Discuss also the number of centimetres, millimetres, and decimetres this is. For example, the chalkboard is 4 m wide, or 40 dm, or 400 cm, or 4000 mm wide.

Have the students estimate and measure several other classroom objects. Have them record both their estimate and the actual measure.

Length

millimetre

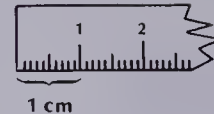


$$10\text{ mm} = 1\text{ cm}$$

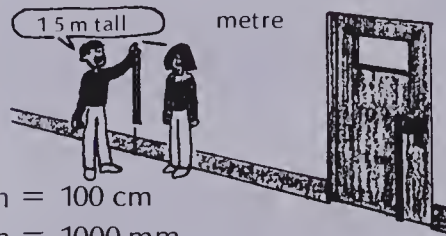
1 mm



centimetre



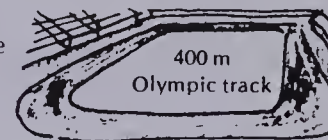
$$1\text{ cm} = 10\text{ mm}$$



$$1\text{ m} = 100\text{ cm}$$

$$1\text{ m} = 1000\text{ mm}$$

kilometre



$$2\frac{1}{2}\text{ times around the track is } 400\text{ m} + 400\text{ m} + 200\text{ m}.$$

$$1000\text{ m} = 1\text{ km}$$

EXERCISES

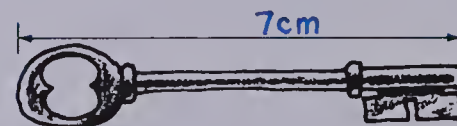
Would *kilometres* or *metres* be used to measure:

- the length of a soccer field **m**
- the height of a mountain **m**
- the width of a street **m**
- the length of a river **km**
- the distance across Canada **km**
- the height of a building **m**

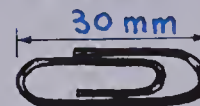
Would *centimetres* or *millimetres* be used to measure:

- the thickness of a dime **mm**
- the length of a pencil **cm**
- the width of a hair **mm**
- the length of a candy bar **cm**

- Measure in centimetres.



- Measure in millimetres.



Using the Exercises

- Questions 1 to 10 involve choosing the appropriate unit of measure for various lengths.
- For questions 11 and 12, students will need a centimetre ruler. The length of the key in question 11 is not an even number of centimetres long. Discuss the recording of its length first in centimetres with a few millimetres left over and then as a decimal number of centimetres.

PRACTICE

Would kilometres, metres, centimetres, or millimetres be used to measure:

- your height **cm**
- the thickness of wire **mm**
- the length of skis **cm**
- the distance to a nearby town **km**
- the length of a comb **cm**
- the length of a parking lot **m**
- the thickness of a toothpick **mm**
- a marathon race **km**

Estimate each length. Check the accuracy by actual measurements.

- the length of your shoe
- your height
- the length of your arm
- the thickness of a quarter
- the length of your classroom
- the length of a school hallway

	Estimate	Actual Measure
9.		
10.		
11.		
12.		
13.		
14.		

Copy and complete.

- 20 mm = **2** cm
- 700 cm = **7** m
- 3000 m = **3** km
- 3 cm = **30** mm
- 5 km = **5000** m
- 4 m = **400** cm

Write in expanded form.

- 27 m = 20 dm + **2500** cm
- 281 cm = **2** m + 8 dm + **1** cm
- 52 m = **5** dm + **2** cm
- 394 cm = **3** m + **9** dm + **4** cm

Answers vary.

Deca

"Deca" means ten. 10 m = 1 dam (decametre)

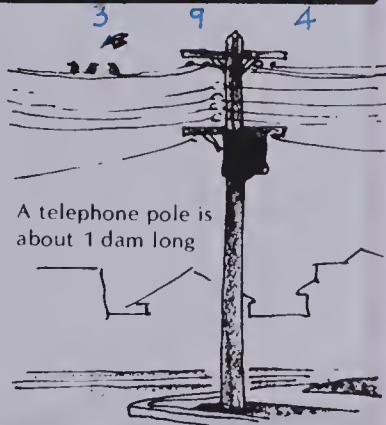
Copy and complete.

A. 1 dam is:

dam	m	dm	cm	mm
1	10	100	1000	10 000

B. 8 dam are:

dam	m	dm	cm	mm
8	80	800	8000	80 000



99

Assigning the Practice

Minimum: 1-17

Average: 1-20

Enriched: 5-24

Reinforcement

1. Provide several lengths of ribbon. Have the students estimate, measure, and record their lengths. Ask them to record their measurements in as many units of measure as possible. This will give them practice in converting from one unit to another.

2. Place 30 pairs of equivalent measures on index cards. Have the students match them as they play a game with rules similar to the game "Fish".

7 m	700 cm	4 dm	40 cm
-----	--------	------	-------

3. Have the students complete a chart of their estimates and their actual measures of themselves. Distribute metre tapes and sticks and centimetre rulers. Ask them to work with a partner as they measure their height, waist, neck, wrist, calf, shoe length, arm span, hand span, height at the shoulder, and height at the waist.

Enrichment

1. Before assigning *Deca* at the bottom of page 99, explain that the prefix, **deca-**, means ten. Write a metric chart on the chalkboard, pointing out how each unit of measure is ten times greater than the one to its right.

$$10 \text{ mm} = 1 \text{ cm}$$

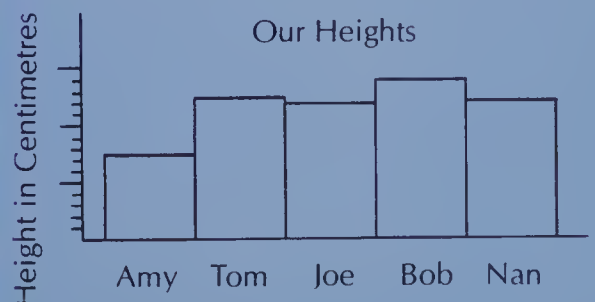
$$10 \text{ cm} = 1 \text{ dm}$$

$$10 \text{ dm} = 1 \text{ m}$$

$$10 \text{ m} = 1 \text{ dam}$$

Explain the new unit of measure, a decametre, as 10 m. Note again the *deca-* prefix.

2. Have the students use a measurement from the Reinforcement activity above to prepare a bar graph for display in the classroom.



Extra Practice

Worksheet M4

Pages 98-99

Complete.

- 4 m = **400** cm
- 60 mm = **6** cm
- 5 km = **5000** m
- 300 cm = **3** m
- 7 m = **700** cm
- 5 m = **50** dm
- 15 mm = **1.5** cm
- 75 mm = **7.5** cm
- 32 mm = **3.2** cm

Measure in centimetres.

- 5 cm**
- 3.5 cm**
- 6 cm**
- 4.5 cm**

Measure in millimetres.

- 18 mm**
- 37 mm**
- 54 mm**
- 62 mm**

Objective M5

Find the perimeter of a figure.

Introducing the Lesson

Review the meaning of perimeter. Point out how the word itself gives a clue to its meaning: per-RIM-meter is a measure of the *distance around* a figure, or of its *rim*. Give individual students a length of string or of masking tape and ask them to place it on the rim of a desk top, a window pane, or a floor tile to illustrate the meaning of perimeter.

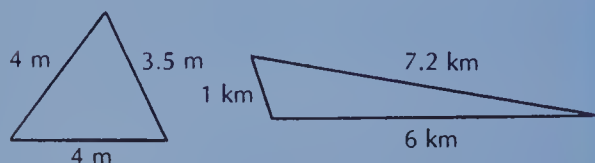
Teaching the Lesson

Read and discuss how perimeter is measured at the top of page 100. Act out the situation presented by showing the class a picture without a frame. Show that the perimeter can be found by placing a string around the rim of the picture and then measuring the string length. Explain also how to measure the lengths of the sides of the picture with a ruler and then total these measurements to get the perimeter. Stress that the perimeter is equal to the sum of the lengths of the four sides of the picture.

Ask the students to form small groups. Pass each group several cardboard polygons and centimetre rulers. (Each group should have the same set of polygons.) Have the students measure and record the perimeter of each polygon.

Discuss the results of their measurements. See if any students found that *not* all sides need to be measured for the perimeter of a rectangle or a square.

Discuss the proper way to label a perimeter with these chalkboard examples.



Perimeter = 11.5 m Perimeter = 14.2 km

Perimeter

Mr. Sanchos is making a picture frame. How long must the wood be to go around all four sides?

$$50 \text{ cm} + 60 \text{ cm} + 50 \text{ cm} + 60 \text{ cm} = 220 \text{ cm}$$

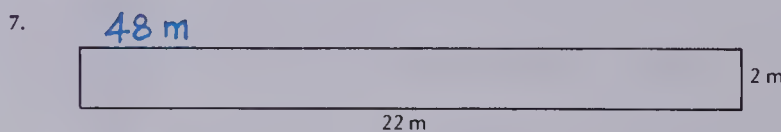
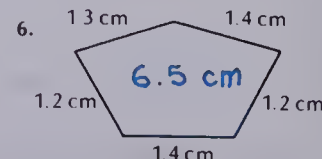
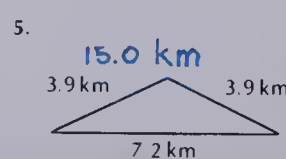
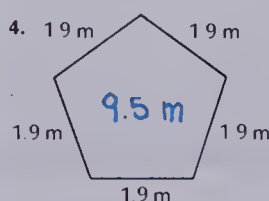
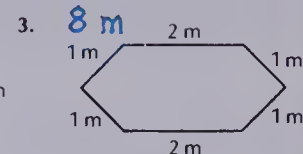
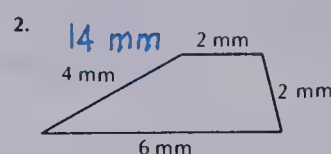
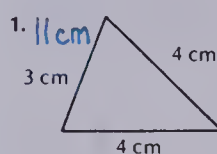
The wood must be 220 cm long.

The distance around a figure is called the **perimeter**. Add the lengths of all the sides to find the perimeter.

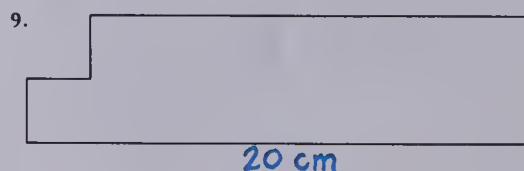
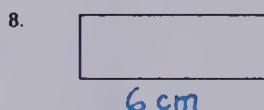


EXERCISES

What is the perimeter of each figure?



Find the perimeter. (Measure the sides in centimetres.)

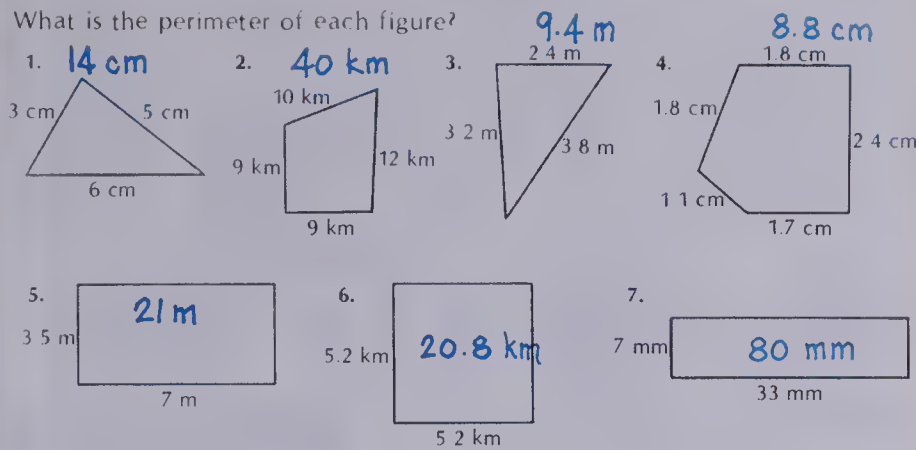


Using the Exercises

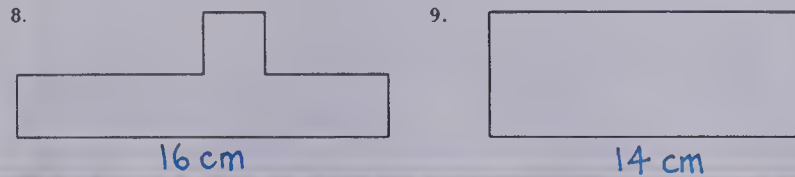
- Questions 1 to 7 require the student to add the given lengths of the sides to find the perimeters of the polygons. Note that questions 4 to 6 involve the addition of decimals.
- Questions 8 and 9 require the student to measure the sides and then find the perimeter.

PRACTICE

What is the perimeter of each figure?



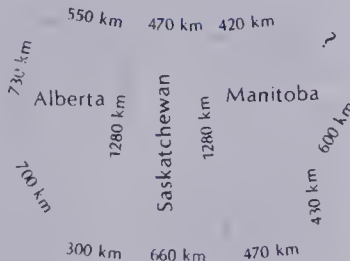
Find the perimeter. (Measure the sides in centimetres.)



USING THE CALCULATOR

Use a calculator to answer these questions.

- a. What is the perimeter of Alberta? **3560 km**
- b. What is the perimeter of Saskatchewan? **3690 km**
- c. The perimeter of Manitoba is 3730 km. How long is the unmarked side? **530 km**
- d. What is the perimeter of all three Prairie Provinces together? **10 980 km**



Assigning the Practice

Minimum: 1-9

Average: 1-9

Enriched: 1-9

Reinforcement

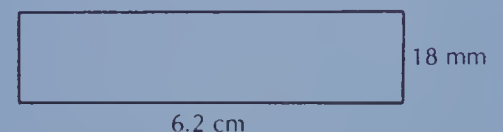
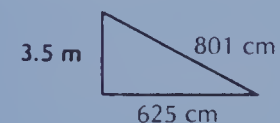
- Ask the students to measure the perimeters of various classroom objects. Include among these several cardboard shapes.
- Have the students complete these tables.

Perimeter of a Square	
Length of one side	Perimeter
46 cm	
12 mm	
5 km	
2.5 m	

Perimeter of a Rectangle		
Length	Width	Perimeter
6 cm	4 cm	
12 m	8 m	
6.2 km	3.4 km	
48 mm	29 mm	

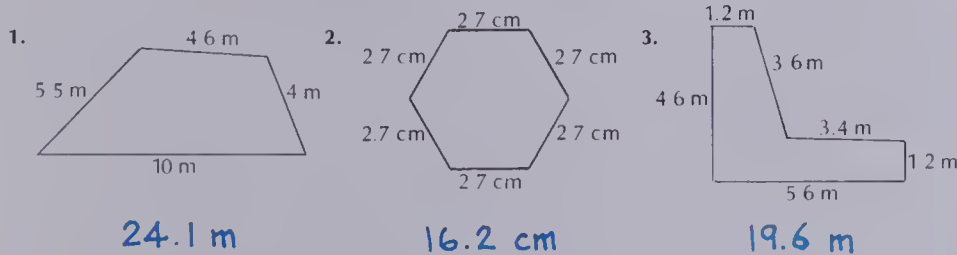
Enrichment

- Assign *Using the Calculator* at the bottom of page 101.
- Give the students a sheet of centimetre grid paper and ask them to draw as many different polygons having a perimeter of 24 cm as they can.
- Ask the students to find the perimeters of polygons whose sides are not all measured in the same unit.



Extra Practice

What is the perimeter of each figure?



Solve.

- The outside edge of a picture is 30 cm long and 20 cm wide. **100 cm**
 How many centimetres from a strip of wood are needed to make its frame?
- Mr. Shuber wishes to fence in a garden that is 6 m wide and 10 m long. He already has 22 m of fence. Does he have enough fence to do the job? If not, how much more does he need? **No. 10 m more.**

Worksheet M5

Pages 100-101

Objective M6

Find the area of a figure by counting square units.

Introducing the Lesson

Show a rectangle on an overhead projector. Point out that if this rectangle represented a yard needing a fence, one would need to find the perimeter of the rectangle. But if the rectangle represented the floor of a room needing tiles, one would need a measure of the *surface* of the floor or the **area**. Place centimetre squares on the rectangle. Explain that the number of centimetre squares that it took to cover the rectangle is the area of the rectangle.

Point out that areas are measured in square units. Smaller surfaces can be measured in square centimetres (cm^2). Larger surfaces can be measured in square metres (m^2). Draw 1 cm^2 and 1 m^2 on the chalkboard as a reference.

Teaching the Lesson

Read and discuss the top of page 102. Have the students count the number of squares in each figure. Note that sometimes a square metre is represented and other times a square centimetre is represented.

Have the students work in small groups. Give each group a pile of paper square centimetres, one paper square metre, and a sheet of figures. Ask the students to place square centimetres over each figure on the worksheet, count the squares used, and record the area. Ask the students to estimate the area of the door, the chalkboard, the floor, etc. using their paper square metre.

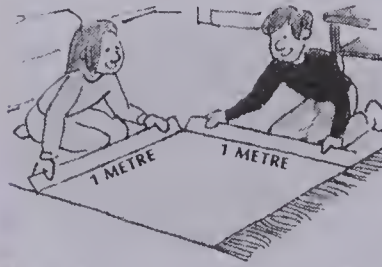
As the students proceed with this activity they may discover that to find areas, especially of rectangles, one does not need to completely cover a surface with squares. This is an important step to attain before they find areas by multiplying.

Area

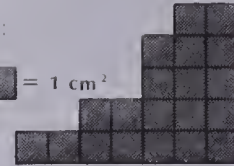
The number of square units on the surface of a figure is its **area**.

Some square units that can be used are:

square centimetres (cm^2)
square metres (m^2)



$\square = 1 \text{ cm}^2$



Area = 20 cm^2

$\square = 1 \text{ m}^2$



Area = 34 m^2

EXERCISES

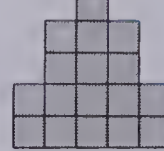
What is the area in square centimetres?

$\square = 1 \text{ cm}^2$

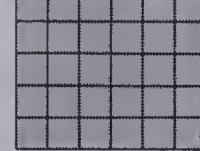
1. 6 cm^2



2. 17 cm^2



3. 30 cm^2



4. 7 cm^2



What is the area in square metres?

$\square = 1 \text{ m}^2$

5. 8 m^2



6. 18 m^2



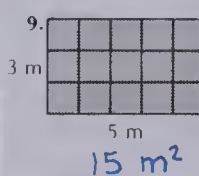
7. 7 m^2



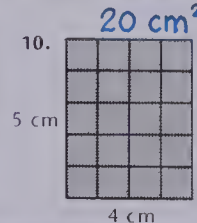
8. 20 m^2



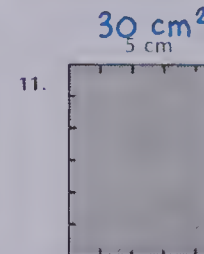
What is the area?



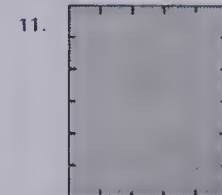
15 m^2



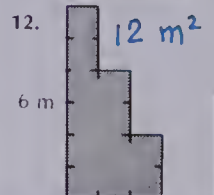
20 cm^2



30 cm^2



30 cm^2



12 m^2

Using the Exercises

- For questions 1 to 4, students must find areas by counting square centimetres.
- For questions 5 to 8, students must find areas by counting square metres.
- Questions 9 to 12 involve areas that are either in square centimetres or square metres.

What is the area in square centimetres? $\blacksquare = 1 \text{ cm}^2$

1. 6 cm^2



2. 12 cm^2



3. 8 cm^2



4. 20 cm^2

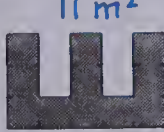


What is the area in square metres? $\blacksquare = 1 \text{ m}^2$

5. 30 m^2



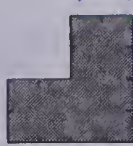
6. 11 m^2



7. 14 m^2

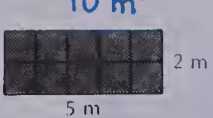


8. 12 m^2



What is the area?

9. 10 m^2



10. 16 m^2



11. 7 m^2



12. 11 cm^2



Choose the more likely area.

13. a record album cover: 961 cm^2 or 9 m^2

14. a dollar bill: 108 m^2 or 108 cm^2

15. a basketball court: 364 m^2 or 364 cm^2

Thirty-Six Squares

The drawing represents a rectangle that has an area of 36 cm^2 and a perimeter of 26 cm

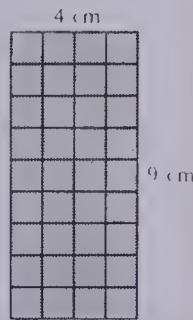
Draw five other rectangles with an area of 36 cm^2

What are the perimeters of these rectangles?

Which has the smallest perimeter?

$1 \times 36, 2 \times 18, 3 \times 12, 6 \times 6$
(Also 8×4.5 , etc.)

Area = 36 cm^2
Perimeter = 26 cm



The square has the smallest perimeter: 24 cm

103

Assigning the Practice

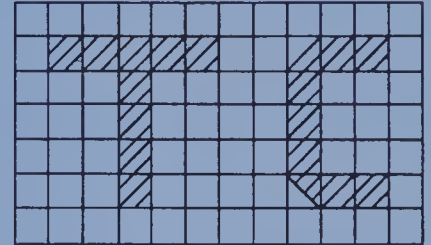
Minimum: 1-12

Average: 1-15

Enriched: 1-15

Reinforcement

1. Ask the students to write their initials on centimetre grid paper and then to find the area of their initials.



2. Have the students draw four shapes on centimetre grid paper, exchange with a partner, and find the areas of the shapes.

3. Take the paper square metres used during the lesson to the gym. Place them on the floor to demonstrate an area in square metres.

Enrichment

1. Assign *Thirty-Six Squares* at the bottom of page 103. Students will need centimetre grid paper for their work. Display their results.

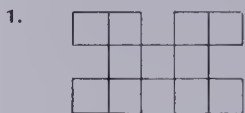
2. Using geoboards or dot paper, ask the students to make rectangles having areas of 9 units, 12 units, 16 units, 20 units, 23 units, and 25 units.

Extra Practice

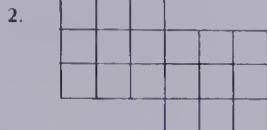
Worksheet M6

Pages 102-103

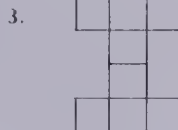
What is the area in square centimetres? $\square = 1 \text{ cm}^2$



11 cm^2



18 cm^2



8 cm^2

Complete.

4. The area of the floor of a room is measured in square metres

5. The area of a sheet of paper is measured in square centimetres

6. The area of a leaf is measured in square millimetres

7. The area of a playground is measured in square metres

Objective M7

Find the area of a rectangle.

Introducing the Lesson

Review the characteristics of a rectangle: four sides, two sets of equal sides, four corners, etc. Discuss the two dimensions of a rectangle: *length* and *width*.

Give each student a sheet of centimetre grid paper. Ask the students to draw a rectangle having a length of 5 cm and a width of 3 cm. Suggest that this rectangle represents a floor that needs tile and that the tiles to be used are square centimetres. Have the students count to find the total number of tiles needed. Have the students recall that this is called finding the **area** of the rectangle. Ask the students to record their result in a chart.

length	width	Area
5 cm	3 cm	15 cm ²

Try several other similar examples.

Teaching the Lesson

Ask the students to study their charts and see if they can think of a way to find the area of a rectangle without counting squares. Once it has been determined that the area of a rectangle can be found by multiplying length by width, read and discuss the top of page 104. Stress that rectangles having sides measured in centimetres have areas in square centimetres; rectangles having sides measured in metres have areas in square metres; etc.

Give each student a sheet of rectangles and a centimetre ruler. Ask them to measure in centimetres and record in a chart the length, width, and area for each. Students can work with a partner so results can be compared and discussed. Include some rectangles on the worksheet whose sides are not an even number of centimetres long.

Area of a Rectangle

3 cm width

5 cm length

Area = length × width
Area = 5 cm × 3 cm
Area = 15 cm²

6 m length

4 m width

Area = length × width
Area = 6 m × 4 m
Area = 24 m²

width

length

Area = length × width
Area = 8 cm × 2 cm
Area = 16 cm²

EXERCISES

What is the area of the rectangle?

1. Area = length × width
Area = 4 m × 3 m
Area = m²
12

6 m

9 m
2. Area = length × width
Area = 80 cm × 50 cm
Area = cm²
4000 cm²

3. Area = length × width
Area = × **6 × 9**
Area = m²
54 m²
4. length = 16 cm
width = 10 cm
Area = cm²
160 cm²

5. length = 24 m
width = 6 m
Area = m²
144 m²

6. length = 35 m
width = 11 m
Area = m²
385 m²

Measure the length and width in centimetres. Find the area.
length = 12 cm Width = 2 cm Area = 24 cm²



Using the Exercises


- Questions 1 to 3 help the student understand the formula: Area = length × width. See that they properly label their results. Question 3 asks the student to find the area of the flag.
- For questions 4 to 6, students must find areas by multiplying length and width and must properly label their answers.
- Question 7 requires a centimetre ruler.

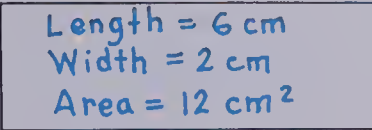
PRACTICE

What is the area of the rectangle?

- length = 50 m
width = 30 m
 1500 m^2
- length = 19.5 cm
width = 8 cm
 156 cm^2
- length = 16 m
width = 0.5 m
 8 m^2
- length = 37 cm
width = 28 cm
 1036 cm^2
- length = 8.5 m
width = 6 m
 51 m^2
- length = 7 cm
width = 55 cm
 385 cm^2

Measure the length and width in centimetres. Find the area.

- 

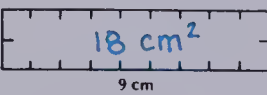
Length = 5 cm
Width = 1 cm
Area = 5 cm^2
- 

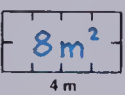
Length = 6 cm
Width = 2 cm
Area = 12 cm^2
- A gym mat measures 6 m by 1.5 m. What is its area? 9 m^2
- A rectangle has an area of 32 m^2 .
The width is 4 m. What is its length? 8 m

REVIEW

- M4 Complete.
- 3 km = 3000 m
 - 90 mm = 9 cm
 - 2 m = 200 cm

- M5 Solve.
- A rectangular city block is 150 m wide and 250 m long. What is its perimeter? 800 m

- M6 Find the area.
- 

18 cm^2
 - 

8 m^2
- M7
- length = 12 m
width = 9 m
Area = 108 m^2
 - length = 20 cm
width = 12 cm
Area = 240 cm^2

105

Assigning the Practice

Minimum: 1-8

Average: 1-10

Enriched: 1-10

Review Exercises

Questions	Objective	Pages
1-3	M4	98-99
4	M5	100-101
5-6	M6	102-103
7-8	M7	104-105

Reinforcement

1. Prepare a set of cardboard rectangles. Assign a number to each. Ask the students to measure their lengths and widths in centimetres, find their areas, then record the findings in a chart.

length	width	Area
8.5 cm	6 cm	51 cm^2

2. Give small groups of students a metric trundle wheel and/or metric measuring tape. Ask them to find the areas of the classroom floor, gym floor, hallway, playground, etc. The lengths, widths, and areas for each should be recorded in a chart.

Enrichment

1. Prepare a worksheet having rectangles of various sizes. Ask the students to find the area and perimeter for each.

2. Ask the students to find the areas of these items, which have sides measured in different units.

- strip of paper: 50 cm wide and 1 m long
- box cover: 15 mm wide and 5 cm long
- tray: 55 cm wide and 400 mm long
- patio: 6 m long and 500 cm wide
- table top: 90 cm wide and 2 m long

Extra Practice

Worksheet M7

Pages 104-105

Complete the chart.

length	width	area
6 m	5 m	30 m^2
12 cm	5 cm	60 cm^2
14 m	10 m	140 m^2
9.5 cm	7 cm	66.5 cm^2
12 cm	2.9 cm	34.8 cm^2
13 m	12.5 m	162.5 m^2
7 cm	6 cm	42 cm^2
12 m	9 m	108 m^2
25 m	9 m	225 m^2

Solve

- A floor has a length of 6 m and a width of 3.5 m. Will a carpet 5 m long and 4 m wide completely cover the floor? **No**

Objective M8

Find the volume of a rectangular prism.

Introducing the Lesson

Hold up a rectangular prism and discuss its characteristics: 6 faces, 8 corners, 8 edges. Note the rectangles on the faces. Discuss its three dimensions: length, width, and height.

Ask the students to work in pairs. Give each pair 24 centimetre cubes. Ask them to make a figure that is 4 cm long, 6 cm wide, and 1 cm high. "How many centimetre cubes were used in all?" *Twenty-four.* Explain that 24 cm^3 is a measure of the *volume* of the figure. Point out the label, cm^3 , and that the raised 3 stands for the three dimensions of the figure.

Teaching the Lesson

Ask the students to build as many different figures as they can using their 24 centimetre cubes. Have them record their findings in a chart.

length	width	height	Volume
4 cm	3 cm	2 cm	24 cm^3
4 cm	2 cm	3 cm	24 cm^3

Ask the students to study their charts and see if there is another way of finding volume without counting cubes. Once it has been determined that the volume of a rectangular prism can be found by multiplying length, width, and height, read and discuss the top of page 106. Point out that the more commonly used cubes are the centimetre and the metre cubes.

Give each pair of students a few boxes and a centimetre ruler. Have them measure in centimetres and record in a chart the length, width, and height of each. Results can then be compared and discussed.

Volume

The number of cubic units contained in a solid is its **volume**.

Some cubic units that can be used are
cubic centimetres (cm^3)
cubic metres (m^3)

There are 3×2 cubes in each layer of the block. There are 2 layers

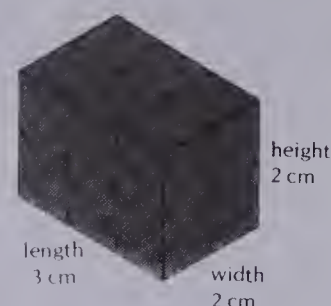
Volume = length \times width \times height

Volume = $3 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm}$

Volume = 12 cm^3

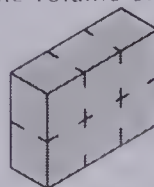


one cubic centimetre (1 cm^3)



Find the volume of the block

1.



Volume = length \times width \times height

Volume = $3 \text{ cm} \times 1 \text{ cm} \times 2 \text{ cm}$

Volume = $\blacksquare \text{ cm}^3$

6

2.



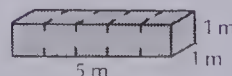
Volume = length \times width \times height

Volume = $3 \text{ m} \times 3 \text{ m} \times 1 \text{ m}$

Volume = $\blacksquare \text{ m}^3$

9

3.



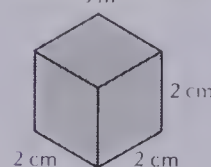
Volume = length \times width \times height

Volume = $\blacksquare \times \blacksquare \times \blacksquare$

Volume = $\blacksquare \text{ m}^3$

5

4.



Volume = length \times width \times height

Volume = $\blacksquare \times \blacksquare \times \blacksquare$

Volume = $\blacksquare \text{ cm}^3$

2

8

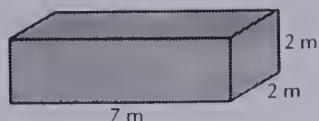
Using the Exercises

- Questions 1 and 2 require the student to complete the multiplication to find the volume. See that the volume in question 2 is properly labelled.
- Questions 3 and 4 require the student to transfer the measurements in the diagrams to the formula and then multiply to find the volume. Discuss these results to ensure that the students have sufficient understanding to proceed independently with the practice exercises.

PRACTICE

Find the volume.

1.



Volume = length \times width \times height

Volume = $\blacksquare \times \blacksquare \times \blacksquare$ $7 \times 2 \times 2$

Volume = \blacksquare 28 m^3

2. length = 5 cm
width = 3 cm
height = 9 cm

135 cm^3

3. length = 2 m
width = 9 m
height = 10 m

180 m^3

4. length = 12 cm
width = 5 cm
height = 20 cm

1200 cm^3

5. length = 8 m
width = 9 m
height = 6 m

432 m^3

6. length = 5 cm
width = 10 cm
height = 15 cm

750 cm^3

7. length = 20 m
width = 30 m
height = 10 m

6000 m^3

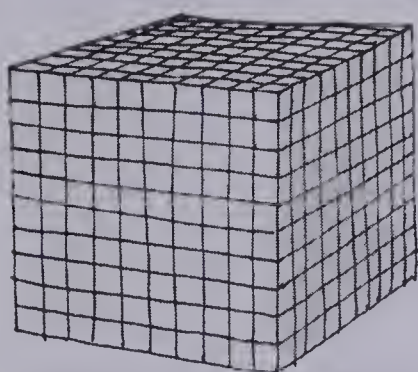
Solve.

8. A shoe box is 30 cm long, 20 cm wide, and 15 cm high.
What is its volume? 9000 cm^3

9. Find the volume of a room 10 m long, 8 m wide, and 3 m high. 240 m^3

10. A block with a volume of 36 cm^3 is 2 cm wide and 3 cm high. How long is the block? 6 cm

A Special Cube



Copy and complete

length = 10 cm

width = 10 cm

height = 10 cm

Volume = \blacksquare 1000 cm^3

or

length = 1 \blacksquare dm

width = 1 \blacksquare dm

height = 1 \blacksquare dm

Volume = 1 \blacksquare dm^3

Try to make a cube with the above measurements.

107

Extra Practice

Worksheet M8

Pages 106-107

Complete the chart

	length	width	height	volume
1.	10 m	5 m	2 m	100 m^3
2.	8 cm	7 cm	9 cm	504 cm^3
3.	8 m	7 m	10 m	560 cm^3
4.	15 cm	2 cm	1.5 cm	45 cm^3
5.	5 m	4 m	2.3 m	46 m^3
6.	12 m	1.5 m	20 m	360 m^3
7.	8 cm	2 cm	2.5 cm	40 cm^3
8.	8 m	2 m	4 m	64 m^3

Solve.

9. A swimming pool is 15 m long, 10 m wide, and 3 m deep.
Can it hold 500 m^3 of water? Yes

Assigning the Practice

Minimum: 1-8

Average: 2-10

Enriched: 2-10

Reinforcement

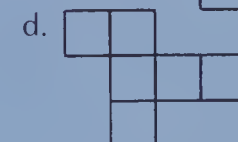
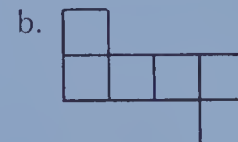
1. Before assigning *A Special Cube* at the bottom of page 107, display a decimetre cube. Try not to mention its name. See if the students can figure it out on their own as they do the exercises. Once the students know it is a decimetre cube, provide them with construction paper, rulers, scissors, and tape for making one. Draw the pattern shown on page 107 on the chalkboard to help them get started.

2. Provide metre sticks and measuring tape for the students to find the volume of the classroom.

3. Ask the students to demonstrate with centimetre cubes all the different rectangular prisms that have a volume of 30 cm^3 , 36 cm^3 , and/or 48 cm^3 .

Enrichment

1. Give the students grid paper, scissors, and tape. Ask them to trace the following patterns, cut them out, and fold them to see which ones will make a cube.



2. Have the students solve this problem: 27 white 1 cm cubes form a 3 cm by 3 cm by 3 cm cube. Then the top, sides, and bottom of the longer cube are painted red. How many of the 1 cm cubes are:

- red only on one side?
- red only on two sides?
- red on three sides?
- red on four sides?
- red on no sides?

Objective M9

Measure capacity using litres and millilitres.

Introducing the Lesson

Discuss the meaning of *capacity*. Examine several containers with the students. Order the containers according to capacity. (If there is doubt about which container holds more, fill one with water and then pour the water into the other container.)

Teaching the Lesson

Read and discuss the top of page 108. Point out the two more commonly used units for measuring capacity: *litre* and *millilitre*. Show a centimetre cube and explain how it holds 1 mL of water. Show a decimetre cube and explain that it holds 1 L or 1000 mL of water. Show other containers that hold nearly or exactly 1 L and 1 mL of water: milk carton, large pop bottle, thimble, teaspoon, etc.

Have the students work in small groups. Give each group a collection of familiar containers, such as soup cans, pop cans, milk cartons, jelly jars, etc., and a graduated cylinder. Ask the students to estimate and then measure the capacity of each. All estimates and measurements should be recorded so that they can be compared, checked, and discussed.

Capacity

A **millilitre** is the amount of liquid that can be put in a cubic centimetre.

 1 mL

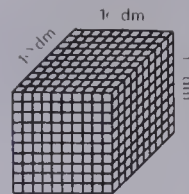


A teaspoon holds about 5 mL



A coffee cup holds about 235 mL

A **litre** is the amount of liquid that can be put in a cubic decimetre.

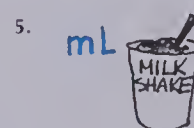


1 L = 1000 mL



EXERCISES

Would *litres* or *millilitres* be used to measure the capacity?



Choose the more likely capacity.

7. flower vase: 500 mL or 50 L
8. soup bowl: 35 L or 350 mL
9. bleach bottle: 3 L or 30 mL
10. soup can: 2 L or 280 mL
11. perfume bottle: 800 mL or 8 mL
12. cream pitcher: 400 mL or 4 mL
13. bottle of glue: 12 mL or 120 mL
14. nail polish: 115 mL or 15 mL

Using the Exercises

- Questions 1 to 6 require the student to show an understanding of the terms litre and millilitre.
- Questions 7 to 14 require the student to visualize the two amounts and then decide which quantity would be more appropriate for the container suggested.

PRACTICE

Choose the more likely capacity.

- a large shampoo bottle
900 mL or 9 L
- a fill-up of gas
3 L or 32 L
- a ginger ale bottle
7 L or 750 mL
- a child's wading pool
80 L or 8 L

Estimate the capacity.

- a bath tub 100 L
- a can of pop 250 mL
- a soup spoon 5 mL
- a garden sprinkling can 3 L

Copy and complete.

- 1000 mL = 1 L
- 5 L = 5000 mL
- 8000 mL = 8 L
- 350 mL + 425 mL = 775 mL
- 16 L - 11 L = 5 L
- 6 L + 240 mL = 6240 mL

Solve.

- René made café au lait with 120 mL of strong coffee and 120 mL of hot milk. How much café au lait did he make? 240 mL
- A bottle of root beer contained 1 L. Ava drank 200 mL and Rod drank 250 mL. How much was left in the bottle? 550 mL

Hecto

"Hecto" means hundred. 100 L = 1 hL (hectolitre)

Copy and complete.

a. Order these from largest to smallest:

1 cL, 1 daL, 1 dL, 1 hL, 1 kL, 1 L, 1 mL

1 mL, 1 cL, 1 dL, 1 L, 1 daL, 1 hL, 1 kL

b. 1 hL is:

kL	hL	daL	L	dL	cL	mL
■	1	■	■	■	■	■

0.1 10 100 1000 100 000
10 000



109

Assigning the Practice

Minimum: 1-10, 15

Average: 3-15

Enriched: 5-16

Reinforcement

1. Display several containers. Ask the students to estimate and then to measure their capacities in millilitres with a graduated cylinder.

2. Set out several small containers and teaspoons. Have the students estimate and then measure how many teaspoons each can hold. Since a teaspoon is 5 mL, have them find how many millilitres each container holds.

3. Prepare 20 pairs of cards for a matching game with rules similar to "Fish" or "Concentration".

8 L

8000 mL

4 L + 150 mL

4150 mL

Enrichment

1. Before assigning *Hecto* at the bottom of page 109, discuss the meaning of the prefix. Discuss all of the metric prefixes learned thus far and list them on the chalkboard as they are mentioned.

2. Have the students determine which is the better buy.

a. 3 L of milk for \$1.80 or 500 mL of milk for 40¢?

b. one 500 mL can of pop for 90¢ or a 4 L jug for \$6.50?

Extra Practice

Worksheet M9

Pages 108-109

Complete. Use mL or L.

- A pop bottle holds 320 mL
- A gas tank holds 95 L
- An orange has 75 mL of juice.
- It takes 35 L of water to shower.
- A pail holds 16 L of water.

Solve.

- Rita mixed 250 mL of orange pop with 300 mL of ginger ale. How much liquid did she have in the new mixture? 550 mL
- A jug contained 4 L of water. Ted drank 200 mL, Bill drank 250 mL, and Pauline drank 250 mL. How much water was left?

3300 mL

Objective M10

Measure mass using grams, kilograms, and tonnes.

Introducing the Lesson

Introduce the term *mass** as that which determines how heavy an object is. Pass objects around the classroom for the students to lift. Ask the students to order the objects according to their mass.

Teaching the Lesson

Read and discuss the top of page 110. Point out the commonly used units for measuring mass: gram, kilogram, and tonne. With balance scales, show how the mass of a raisin is about 1 g. Explain that the mass of 1 cm³ of water is also 1 g. Pass a raisin around so each student can feel its mass. Show several familiar food containers having masses measured in grams.

Demonstrate on the balance scales a bag of jelly beans having a mass of 1 kg. (This is about 1000 jelly beans.) Point out that 1 L or 1 dm³ of water also has a mass of 1 kg. Stress the relationship of 1 kg to 1000 g. Pass the jelly bean bag around and let the students feel the mass. Have the students estimate and then measure their body masses with a floor scale.

Discuss the illustration of a metric tonne on page 110. Point out that 1 t is equal to 1000 kg. Ask how many students it would take to make a mass of 1 t.

Have the students work in small groups measuring and recording the masses of several objects.

*NOTE: Technically, mass is the amount of matter in an object. Mass never changes. Weight is the force of gravity on an object. Weight may change slightly at different locations on the earth and it will be less in outer space and on the moon.

Mass

gram

a raisin



1 cm³ of water



Both have a mass of about 1 g.

kilogram

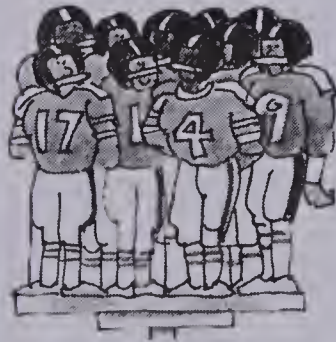


1000 cm³ or
1 dm³ of water



Both have a mass of 1 kg.

$$1 \text{ kg} = 1000 \text{ g}$$



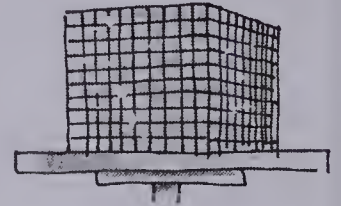
10 heavy
football players

tonne

$$1 \text{ t} = 1000 \text{ kg}$$



1 m³ of water



EXERCISES

Would *grams*, *kilograms*, or *tonnes* be used to measure the mass?

1. g



2. kg



3. t



4. kg



5. g



6. t



What is the more likely mass?

7. five potatoes: 1 kg or 5 kg

9. an elephant: 400 kg or 4 t

11. five paper clips: 5 g or 45 g

13. one train car: 2 t or 20 t

8. a table telephone: 14 kg or 1400 g

10. a large apple: 230 g or 2 kg

12. a one-year-old child: 1100 g or 11 kg

14. two raisins: 2 g or 120 g

Using the Exercises

- Questions 1 to 6 require the students to show an understanding of the terms gram, kilogram, and tonne.
- Questions 7 to 14 require the student to visualize the objects and the given masses in order to decide which would be appropriate.

PRACTICE

Choose the more likely mass.

1. a turkey: 60 g or 6 kg
2. 25 raisins: 25 g or 250 g
3. a ski boot: 1.7 kg or 17 kg
4. 3 L milk: 300 g or 3 kg
5. a small car: 1 t or 100 kg
6. a tennis ball: 50 g or 550 g

Copy and complete.

7. 1 kg = 1000 g
8. 9000 g = 9 kg
9. 4000 g = 4 kg
10. 1 t = 1000 kg
11. 5000 kg = 5 t
12. 2000 kg = 2 t
13. 1 kg + 250 g = 1250 g
14. 900 g + 1100 g = 2 kg
15. 4 kg - 500 g = 3500 g
16. 1 t = 100 kg + 900 kg

By how much is the mass smaller or larger than 1 t?

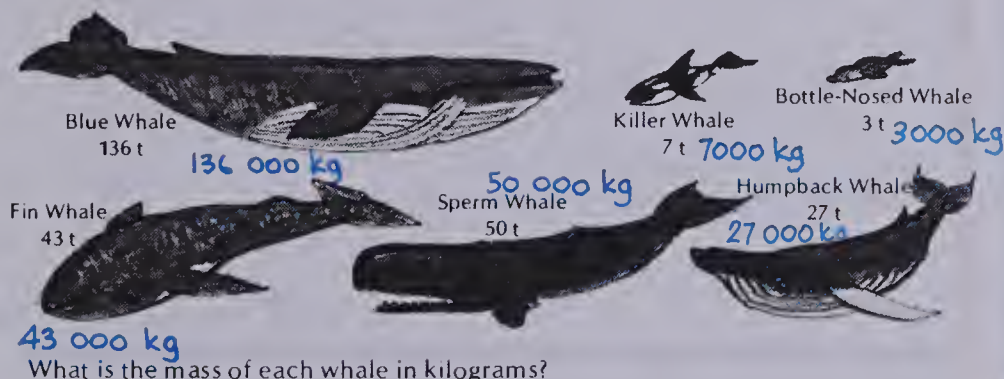
17. 950 kg 50 kg
18. 2460 kg 1460 kg
19. 0.5 t 0.5 t
20. 145 kg 855 kg
21. 1.5 t 0.5 t

Solve.

22. One tub of honey has a mass of 3.6 kg. What would be the mass of 4 tubs this size? 14.4 kg
23. Mr. Bauer went on a diet. His mass went from 90 kg to 78 kg. How much did he lose? 12 kg

Stunning Tonnes

Make a bar graph of the masses of these whales.



111

Assigning the Practice

Minimum: 1-12, 22-23

Average: 1-16, 22-23

Enriched: 7-23

Reinforcement

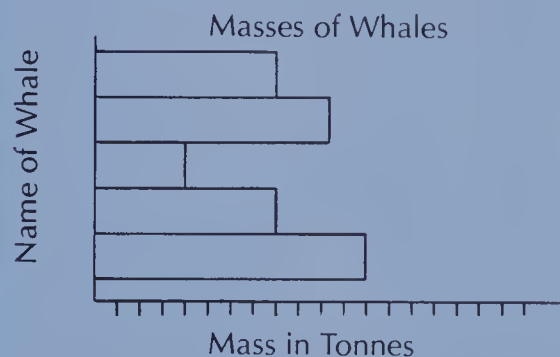
1. Provide Centicubes (which have a mass of 1 g) and balance scales. Ask the students to estimate, measure, and record the mass of several small classroom objects.
2. Prepare domino cards on cardboard strips for the students to match equivalent masses as they play.

2000 g	5000 kg
	5 t
	2 kg

3. Have the students bring in for display labels from food items showing grams or kilograms.

Enrichment

1. Assign *Stunning Tonnes* at the bottom of page 111. Students may need some help getting started on the bar graph.



2. Have the students choose two or three of their favourite animals and research their average masses. Display their findings.

Extra Practice

Complete. Use g, kg, or t.

1. A pumpkin has a mass of about 4 kg.
2. A package of weiners has a mass of about 500 g.
3. A sugar cube has a mass of about 4 g.
4. A large car has a mass of about 2 t.
5. A thousand raisins have a mass of about 1 kg.

Solve.

6. Sue bought a 1 kg container of cottage cheese. Bob bought a 250 g container of cottage cheese. Who bought more cottage cheese? Sue
7. The dry ingredients of a recipe are 750 g of flour, 250 g of bran, and 50 g of sugar. Is that more than a kilogram of dry ingredients? How much more? Yes, 50 g more.

Worksheet M10

Pages 110-111

Objective M11

Classify angles as right angles, less than right angles, or more than right angles.

Introducing the Lesson

Discuss the term *angle*. Point out the corners of various classroom objects (desk corner, corner of chalkboard, corner formed by two walls, etc.). Explain how the two sides meet forming a corner, or angle. Draw a window on the chalkboard. Represent the corners of the window pane with lines. Explain that an angle is formed when two straight lines or line segments meet. Point out the vertex of the angle. Explain that the vertex is the place where the two lines meet. Make other drawings of familiar objects on the chalkboard (stop sign, clock hands, sail boat, etc.). Ask the students to point out all the angles and vertices they see.

Teaching the Lesson

To aid the students in classifying angles, give each one an index card. Start by having the students test right angles. Test the right angle at the top of page 112 first. Then ask the students to test a page corner from their Math book, a floor tile, a corner of writing paper, etc. in order to get a feeling for the appearance of a right angle. Give the students a sheet of graph paper and a ruler. Ask them to draw a few right angles and then test them with their index cards.

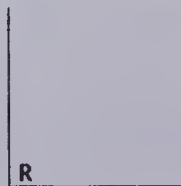
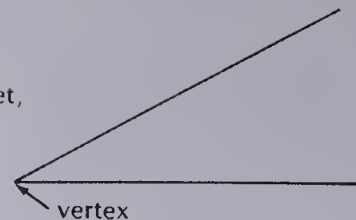
Next have the students place their index cards over the acute angle on page 112. Ask if they can see any angles in the classroom that are less than a right angle (perhaps between the hands on the clock). Have the students draw a few angles on their graph paper with their rulers and prove (with their cards) that they are smaller than a right angle.

Now have the students test the obtuse angle on page 112. See if they can spot any angles like this in the classroom. Ask the students to draw and test some obtuse angles on their graph paper, too. (It is not necessary, for the student at this time to know the terms *acute* and *obtuse*.)

Angles

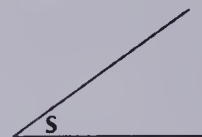
When two straight lines or line segments meet, they form an **angle**.

The point where the two lines meet is called the **vertex**.

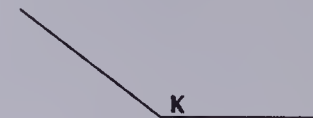


Angle **R** is a **right angle**.

Test it with the square corner of a piece of paper.



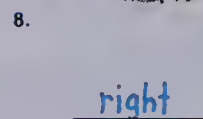
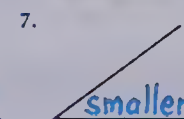
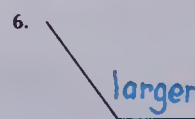
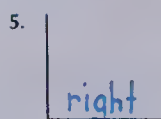
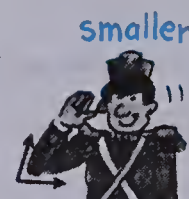
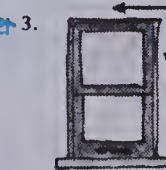
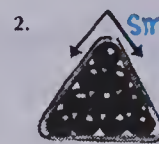
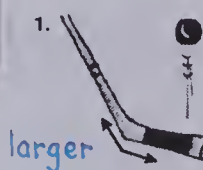
Angle **S** is smaller than a right angle.



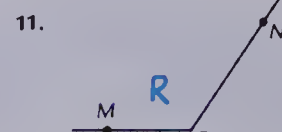
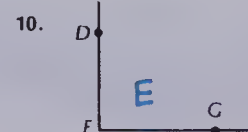
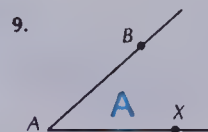
Angle **K** is larger than a right angle.

EXERCISES

What kind of angle is shown? (right angle, smaller than a right angle, or larger than a right angle.)



What letter is at the vertex of the angle?



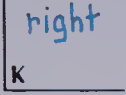
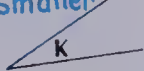
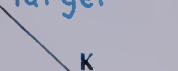





112

Using the Exercises



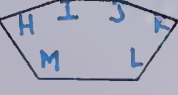
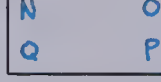
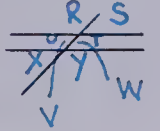
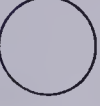
- Questions 1 to 8 require the students to classify each angle. Encourage them to use their index cards to test the angles.
- Questions 9 to 11 require the student to show an understanding of the term *vertex*.

PRACTICE

What kind of angle is angle K in each figure?

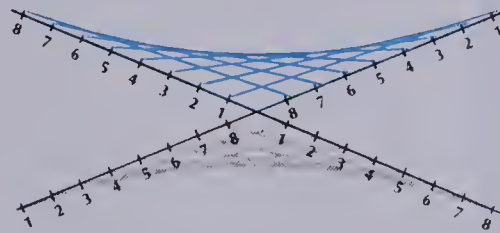
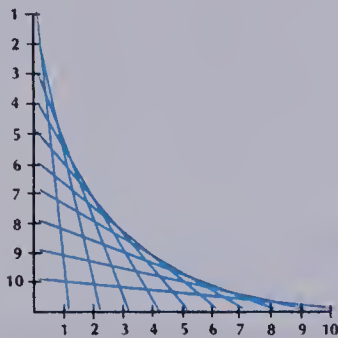
1.  right
2.  smaller
3.  larger
4.  smaller
5.  right
6.  larger
7.  right
8.  smaller

Copy each figure. Label every angle with a letter.

9. 
10. 
11. 
12. 
13. 
14. 

Line Designs

Copy each model. Use a pencil and ruler to join 1 to 1, 2 to 2, 3 to 3, and so on. What do you notice?



113

Assigning the Practice

Minimum: 1-14

Average: 1-14

Enriched: 1-14

Reinforcement

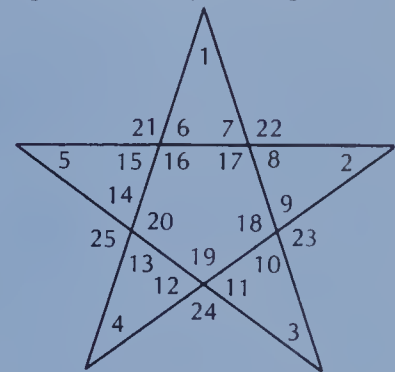
1. Display a chart of 26 capital letters of the alphabet. Ask the students to list which letters contain right angles, larger than right angles, and smaller than right angles.

2. Prepare a set of cards having a right, an acute, or an obtuse angle on each card. Ask the students to test and classify each angle.

Enrichment

1. Assign *Line Designs* at the bottom of page 113. Talk about the angles formed and point out that these kinds of designs can be done inside any kind of angle. Encourage the students to draw angles and create their own line designs. Some students may even be interested in transferring their design to stiff paper and sewing their design with thread.

2. Have the students count and classify the angles made by this figure.


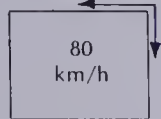
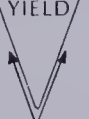
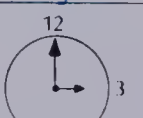
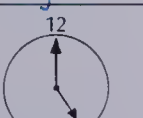
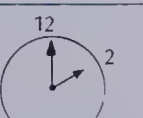


Extra Practice

Worksheet M11

Pages 112-113

Describe the angle as a right angle, smaller than a right angle, or larger than a right angle.

1.  larger
2.  right
3.  smaller
4.  right
5.  larger
6.  smaller

Solve

7. What type of angle is formed by the hands of the clock at 09.00? right
01.00? 05.05? smaller, larger

Objective M12

Measure angles with a protractor.

Introducing the Lesson

Draw a 50° angle on the chalkboard. Explain how angles, too, can be measured, just as lengths, areas, capacities, and masses are. Point out the need for a unit of measure.

Have ready a cardboard 5° angle. Tell the students that this could be the unit. Place it on the 50° angle and have the students count the number of these cardboard units that fit into the angle. Explain that this is how we measure angles.

Teaching the Lesson

Introduce the protractor as the measuring instrument for angles and the degree as the unit of measure, referring to the illustration at the top of page 114. Point out that the marks on the rim of the protractor indicate the number of degrees. Give the students protractors so they can see more clearly the number of degrees shown on a protractor.

Distribute a sheet having on it several angles to be measured. Using one of the angles on the sheet, explain the steps for measuring angles.

1. Make an estimate. "Is the angle a right angle, less than a right angle, or more than a right angle?"
2. Place the protractor on the angle. The vertex of the angle must be on the centre mark of the protractor. One side of the angle must be on 0° .
3. Read the measure of the angle. "Did you estimate that your angle was a right angle? Then the other side of the angle is on 90° ." If the angle was estimated as being less than a right angle, then the student reads the degrees from the set of numbers less than 90. If the angle was estimated to be more than a right angle, the student reads the degrees from the set of numbers greater than 90.
4. Label the measure of the angle. See that the students write the measure and the symbol for degrees properly.

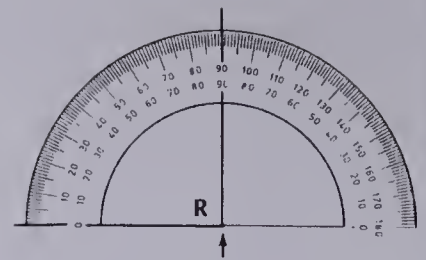
Have the students work in pairs measuring the rest of the angles on the sheet, compare, and discuss their findings.

Measuring Angles

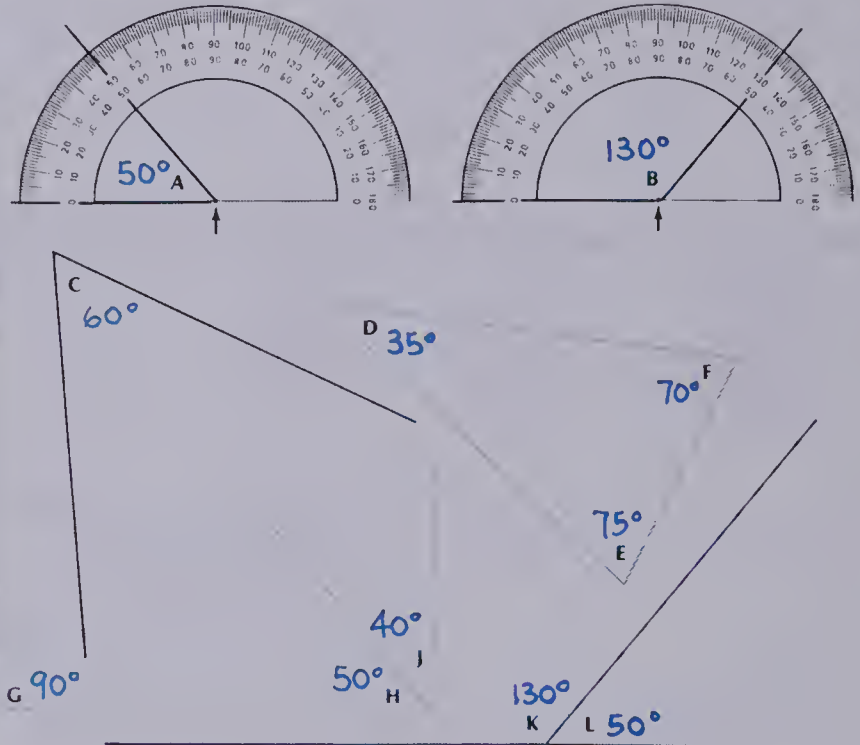
A **protractor** is used to measure angles.

Angle **R** is a right angle
It measures **90 degrees**.

This is often written as 90° .

**EXERCISES**

What is the measure of each angle?



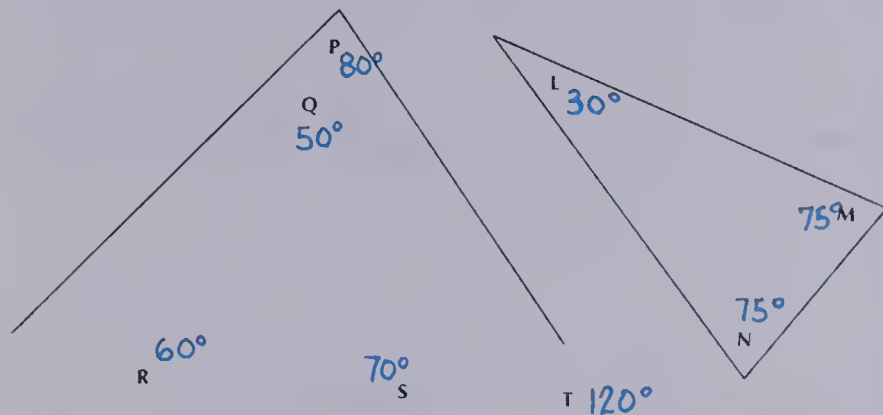
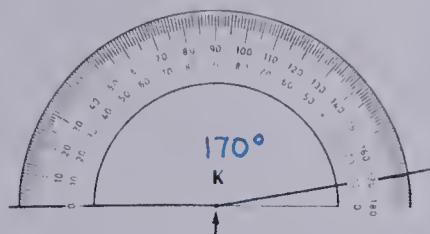
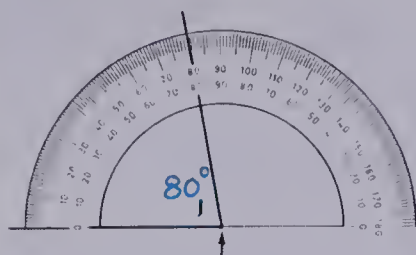
114

Using the Exercises

- Ask the students to measure angles A to L with your guidance and class discussion. Point out that the lengths of some of the sides of the angles need to be extended with a straightedge so that the measure of the angle can be read on the protractor.

PRACTICE

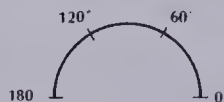
1. What is the measure of each angle?



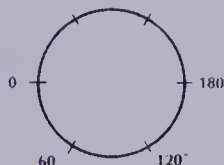
Use a protractor to draw the angle.

2. 90° 3. 45° 4. 135° 5. 5° 6. 170°

Protractor Design



Make a semicircle.
Put a mark at 0° ,
 60° , 120° , and 180° .



Finish the circle by
making another
semicircle. Put
marks at 60° and 120° .



Connect the marks
with straight lines.
Colour the design

115

Assigning the Practice

Minimum: 1-6

Average: 1-6

Enriched: 1-6

Reinforcement

1. Have the students work in pairs. Ask them to draw six angles with their rulers and then exchange them with their partners for measuring.

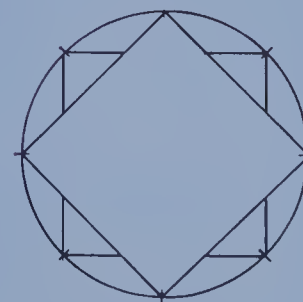
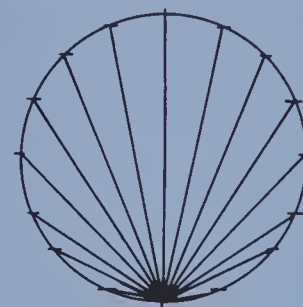
2. Divide the students into two teams. Draw an angle on the chalkboard and have all players on both teams write an estimate of the angle's measure. Measure the angle. The player whose estimate is the closest earns a point for his or her team. The team with the most points wins.

3. Ask the students to fold a piece of paper in many ways. Sides do not have to meet. Have them open their papers and trace the angles that have been formed. These angles can then be measured with a protractor.

Enrichment

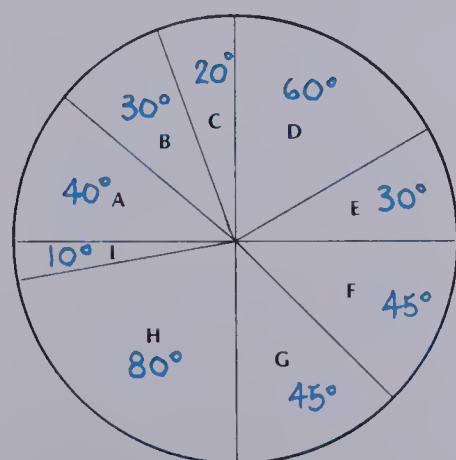
Assign *Protractor Design* at the bottom of page 115. Show how a half circle (180°) and a full circle (360°) can be made with a protractor. Encourage the students to try marking off every 20° , 30° , or 40° and creating other protractor designs.

Can they duplicate these designs with their protractor and rulers?



Extra Practice

What is the measure of each angle?



A circle has 360° .
If you are correct,
the sum of all the
angle measures
is 360° .

Worksheet M12

Pages 114-115

Objective PS4

Choose the correct operation in problem solving.

Introducing the Lesson

Review the key words and phrases in word problems that help one decide on the operation to choose for solving. Say several word problems and ask the students to note the key words and phrases. These points should be raised:

1. Total of different quantities → addition
2. Number of equal quantities from a larger quantity → division
3. Difference → subtraction
4. Area, given the dimensions → multiplication
5. How many in all of different quantities → addition
6. How much more → subtraction
7. Equal quantities (daily) from larger quantity (per week) → division
8. Equal quantities (per hour) from larger quantity (4 hours) → division

Teaching the Lesson

Assign the quiz on page 116. After the students have completed it, discuss how to choose the correct operation in each example. Relate this discussion to the previous one on key words and phrases. For example, question 1 asks for the total of two different quantities. Therefore, it is an addition situation.

Problem Solving Quiz



EXAMPLES

Choose the operation that will give the correct answer.

1. A truck is loaded with 2 crates that have masses of 4.5 t and 3 t. What is the total mass of the crates?
 $4.5 + 3$ $4.5 - 3$ 4.5×3 $4.5 \div 3$
2. How many 8 m lengths of extension cord can be cut from a 120 m spool of the cord?
 $120 + 8$ $120 - 8$ 120×8 $120 \div 8$
3. One angle of a triangle is 102° and another is 51° . What is the difference in sizes?
 $102 + 51$ $102 - 51$ 102×51 $102 \div 51$
4. What is the area of a rectangular room 4.8 m long and 4 m wide?
 $4.8 + 4$ $4.8 - 4$ 4.8×4 $4.8 \div 4$
5. Diane drove her car 300 km on Saturday and 150 km on Sunday. How far did she drive in all?
 $300 + 150$ $300 - 150$ 300×150 $300 \div 150$
6. The gas tank in Bill's car holds 100 L. The tank in Joe's car holds 50 L. How much more does the tank in Bill's car hold?
 $100 + 50$ $100 - 50$ 100×50 $100 \div 50$
7. A factory uses 4900 m^3 of natural gas per week. How much is that daily, if they operate 7 days a week?
 $4900 + 7$ $4900 - 7$ 4900×7 $4900 \div 7$
8. During a cold spell, the temperature dropped 20°C in 4 hours. About how much did it drop each hour?
 $20 + 4$ $20 - 4$ 20×4 $20 \div 4$

Using the Exercises

- Once the questions on page 116 have been discussed and the operation decided upon, have the students solve the problems.

PRACTICE

Solve.

1. Mrs. Larson bought a 5 kg roast that cost \$6.25 a kilogram. How much did she pay for the roast? **\$31.25**
2. A pilot logged 4348 km one week and 3462 km the next week. How many more kilometres did he log the first week? **886 km**
3. How much fencing is needed to go around a lot that is 36 m, 28 m, 45 m, and 52 m long on its four sides? **161 m**
4. A TV shop ordered 8 new sets from a distributor. The bill was \$3720. How much did each set cost the store? **\$465**

REVIEW

What is the volume of the box?

- M8
1. length = 6 cm, width = 9 cm, height = 18 cm **972 cm³**
 2. length = 5 m, width = 4 m, height = 12 m **240 m³**

Choose the more likely capacity.

- M9
3. a thermos bottle: **500 mL** or 5 L
 4. a kitchen sink: 5 L or **45 L**

Copy and complete.

- M10
5. 3000 kg = **3** t
 6. 8 kg = **8000** g
 7. 1500 kg + 500 kg = **2** t

Name the angles that are right angles.

- M11
8.  **K, L, P**
 9.  **D, C**

Use a protractor to draw the angle.

- M12
10. 80°
 11. 15°
 12. 145°
 13. 90°

117

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-2	M8	106-107
3-4	M9	108-109
5-7	M10	110-111
8-9	M11	112-113
10-13	M12	114-115

Reinforcement

1. Ask each student to make up problems involving one operation. As the students read the problems aloud, challenge the rest of the class to choose the operation. The first one to get the correct operation then reads his or her problem.

2. Write word problems on cards. Assign a number of points (according to degree of difficulty) for each problem. Make a game board having a path from start to finish. Players, in turn, turn over a card, solve the problem, and, if correct, advance on the game board the number of points given on the card. Incorrect answers mean moving back one space. The first player to reach finish wins.

Enrichment

Give the students a newspaper ad page. Ask them to make up an addition, a subtraction, a multiplication, and a division problem from the information on the page. Display their results for solving by classmates.

Extra Practice

Worksheet PS4

Pages 116-117

Solve.

1. In 1974, 345 645 children were born in Canada and 166 794 people died. How much did the population increase?
178 851
2. If a \$12 000 car has an estimated life of 8 years, about how much is the loss in value of the car every year?
\$1500
3. An investor bought 5678 shares of oil stock at \$9.00 a share. How much did he have to pay for the shares?
\$51 102
4. The attendance at a country fair was 13 456 on Saturday and 14 789 on Sunday. What was the attendance for both days?
28 245

Problem Solving Activities

Assign Level 5, Unit 5.

Unit 5 Objective	Test Questions	Pages
M4	1-4	98-99
M5	5-6	100-101
M6	7	102-103
M7	8	104-105
M8	9-11	106-107
M9	12-13	108-109
M10	14-16	110-111
M11	17	112-113
M12	18-19	114-115
PS	20	

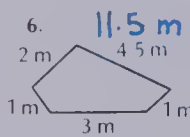
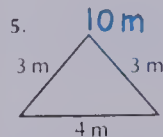
TEST

UNIT 5

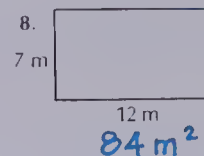
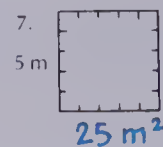
Would centimetres, metres, millimetres, or kilometres be used to measure?

- the length of a pencil **cm**
- the thickness of cardboard **mm**
- the length of a driveway **m**
- the width of a country **km**

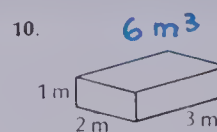
What is the perimeter?



What is the area?



What is the volume?



11. length = 12 cm
width = 15 cm
height = 20 cm
3600 cm³

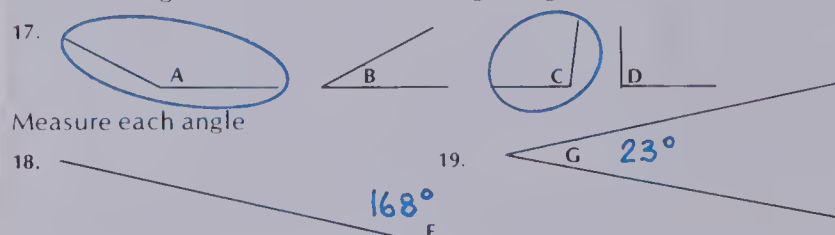
Choose the more likely capacity

12. a jar of pickles: **900 mL** or 9 L 13. a water bucket: 800 mL or **8 L**

Copy and complete

14. 1000 kg = **1** t 15. 6 kg = **6000** g 16. 4000 kg + 2000 kg = **6** t

Name the angles that are *more than* a right angle.



Measure each angle

Solve.

20. What does 1 kg of chicken cost if 3 kg cost \$10.47? **\$3.49**

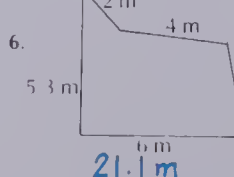
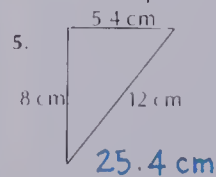
Post-test

Unit 5

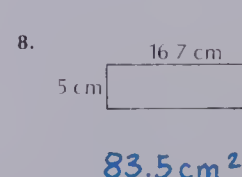
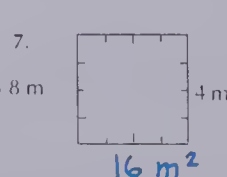
Would centimetres, metres, millimetres, or kilometres be used to measure:

- length of an airplane **m**
- thickness of a string **mm**
- height of a tulip **cm**
- width of an ocean **km**

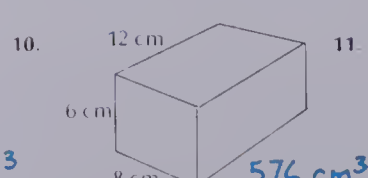
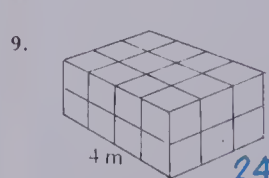
What is the perimeter?



What is the area?



What is the volume?



11. length 17 m
width 6 m
height 9 m
918 m³

DIVISION

Divide.

1. $7 \overline{)45}$ 6R3
2. $8 \overline{)30}$ 3R6
3. $9 \overline{)50}$ 5R5
4. $6 \overline{)40}$ 6R4
5. $356 \div 7$ 50R6
6. $645 \div 8$ 80R5
7. $254 \div 5$ 50R4
8. $183 \div 6$ 30R3
9. $38 \div 2$ 19
10. $57 \div 3$ 19
11. $49 \div 6$ 8R1
12. $96 \div 4$ 24
13. $286 \div 5$ 57R1
14. $375 \div 6$ 62R3
15. $193 \div 4$ 48R1
16. $755 \div 9$ 83R8
17. $3 \overline{)716}$ 238R2
18. $8 \overline{)954}$ 119R2
19. $2 \overline{)454}$ 227
20. $4 \overline{)571}$ 142R3
21. $7 \overline{)6475}$ 925
22. $9 \overline{)8916}$ 990R6
23. $6 \overline{)5318}$ 886R2
24. $9 \overline{)4248}$ 472
25. $2 \overline{)4673}$ 2336R1
26. $3 \overline{)5758}$ 1919R1
27. $2 \overline{)3574}$ 1787
28. $4 \overline{)9175}$ 2293R3
29. $5 \overline{)514}$ 102R4
30. $4 \overline{)806}$ 201R2
31. $5 \overline{)4508}$ 901R3
32. $2 \overline{)6001}$ 3000R1
33. $\$535 \div 5$ \$107
34. $\$0.24 \div 2$ \$0.12
35. $\$24.30 \div 6$ \$4.05
36. $\$40.24 \div 8$ \$5.03

Solve

37. If six handkerchiefs cost \$6.48, what does one cost? \$1.08
38. There are 8 trays with 48 cookies on each tray.
How many cookies are there in all? 384
39. A carpenter needs 8 pieces of molding, each 16 cm long.
She has one strip which is 135 cm long.
Does she have enough molding? Yes
40. The same carpenter has 500 nails and 150 screws.
The shelves she is building will need 8 screws each.
She wants to finish two sets of shelves with 8 shelves in each set.
Does she have enough screws? Yes

119

Choose the most likely capacity

12. tube of toothpaste 150 ml or 1 L
13. a birdbath 700 mL or 7 L

Complete

14. 9 kg = 9000 g
15. 2 t = 2000 kg
16. 6000 g = 6 kg

Circle the angles that are right angles



Measure each angle

18. 160°
19. 30°

Solve

20. What does 7 kg of apples cost if 1 kg costs \$3.99?
\$27.93

UNIT 6

Multiplication and Division

Theme: Entertainment

Lesson		Objective	Pages
Preview		Review addition, subtraction, multiplication, and division skills.	121
1	A26	Multiply a three-digit multiple of 10 by a two-digit number.	122-123
2	A27	Estimate the product of a three-digit and a two-digit number.	124-125
3	A28	Multiply a three-digit number by a two-digit number.	126-127
4	M13	Multiply money.	128-129
5	A29	Divide a two- or three-digit dividend by a two-digit divisor (one stage), with or without a remainder.	130-131
6	A30	Divide a three-digit dividend by a two-digit divisor (one stage), with or without a remainder.	132-133
7	A31	Divide a three- or four-digit dividend by a two-digit multiple of ten (two stages).	134-135
8	A32	Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.	136-137
9	A33	Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.	138-139
10	PS5	Solve problems that have extraneous information.	140-141
Test		Multiplication and division	142
Review		Measurement	143

About This Unit

The aim of this unit is to extend the multiplication and division skills studied in Units 3 and 4. The place-value aspect of multiplication emphasized in this unit extends from the number block place-value models for multiplication used in Unit 3.

$$\begin{array}{r} 742 \\ \times 53 \quad (50 + 3) \\ \hline 2226 \quad (3 \times 742) \\ 37100 \quad (50 \times 742) \\ \hline 39326 \end{array}$$

The two meanings of division (first discussed in Unit 4) are also presented in various problem-solving situations.

a. **partitive**

252 objects divided into groups of 36.

$$\begin{array}{r} 7 \\ 36 \overline{)252} \\ - 252 \\ \hline 0 \end{array}$$

There are 7 groups.

b. **measurement**

252 objects divided into 36 groups.

$$\begin{array}{r} 7 \\ 36 \overline{)252} \\ - 252 \\ \hline 0 \end{array}$$

There are 7 in each group.

The division section of this unit also sequentially presents the steps of long division. Care is taken to explain every step in detail to aid students in estimating quotients and in reducing the chance for error. The EMS cycle of Unit 4 is again emphasized in this unit.

1. **Estimate.**

$$\begin{array}{r} 5 \\ 42 \overline{)2178} \end{array}$$

Since there are 50 forty-twos in 2178 (not 5000, 500, or 5), the 5 is written over the 7 in the tens place.

2. **Multiply.**

$$\begin{array}{r} 5 \\ 42 \overline{)2178} \\ - 210 \\ \hline \end{array}$$

3. **Subtract and compare.**

$$\begin{array}{r} 5 \\ 42 \overline{)2178} \\ - 210 \\ \hline 7 \end{array}$$

The remainder, 7, is less than the divisor, 42.

Bring down the 8 ones and repeat the cycle.

$$\begin{array}{r} 51 \text{ R}36 \\ 42 \overline{)2178} \\ - 210 \\ \hline 78 \\ 42 \\ \hline 36 \end{array}$$

Checking answers for both multiplication and division is emphasized in this unit. A short cut for checking multiplication is shown on page 125. Students are frequently asked to check their division by multiplying.

Ideas

1. Success with this unit is largely dependent on a knowledge of basic multiplication and division facts. Frequent drills or spot checks of the facts during the study of this unit would be most appropriate.
2. Be alert for problems students may be having with zero in the quotient or with zero in a factor. For example:

$$\begin{array}{r} 60 \\ 27 \overline{)1620} \\ - 162 \\ \hline 00 \\ - 00 \\ \hline 0 \end{array} \qquad \begin{array}{r} 508 \\ \times 26 \\ \hline 3048 \\ 10160 \\ \hline 13208 \end{array}$$

3. Review counting by multiples of ten to help students estimate quotients.

$$\begin{array}{r} 89 \overline{)314} \end{array}$$

89 rounds up to 90.
90,180,270. Try 3.

4. It is not imperative to assign all questions to all students. Please be selective in matching students' needs with appropriate questions.

UNIT 6

MULTIPLICATION & DIVISION



Unit 6 Objective	Test Questions	Pages
A26	1-4	122-123
A27	5-8	124-125
A28	9-12	126-127
M13	13-16	128-129
A29	17-20	130-131
A30	21-24	132-133
A31	25-28	134-135
A32	29-32	136-137
A33	33-36	138-139
PS	37	140-141

Pretest

Multiply.

$$\begin{array}{r} 1. \quad 530 \\ \times 27 \\ \hline 14 \, 310 \end{array}$$

$$\begin{array}{r} 2. \quad 640 \\ \times 35 \\ \hline 22 \, 400 \end{array}$$

$$\begin{array}{r} 3. \quad 820 \\ \times 93 \\ \hline 76 \, 260 \end{array}$$

$$\begin{array}{r} 4. \quad 760 \\ \times 57 \\ \hline 43 \, 320 \end{array}$$

Estimate the product.

$$\begin{array}{r} 5. \quad 695 \\ \times 18 \\ \hline 14 \, 000 \end{array}$$

$$\begin{array}{r} 6. \quad 327 \\ \times 32 \\ \hline 9000 \end{array}$$

$$\begin{array}{r} 7. \quad 711 \\ \times 25 \\ \hline 21 \, 000 \end{array}$$

$$\begin{array}{r} 8. \quad 876 \\ \times 27 \\ \hline 27 \, 000 \end{array}$$

Multiply.

$$\begin{array}{r} 9. \quad 436 \\ \times 33 \\ \hline 14 \, 388 \end{array}$$

$$\begin{array}{r} 10. \quad 781 \\ \times 54 \\ \hline 42 \, 174 \end{array}$$

$$\begin{array}{r} 11. \quad 602 \\ \times 79 \\ \hline 47 \, 558 \end{array}$$

$$\begin{array}{r} 12. \quad 846 \\ \times 86 \\ \hline 72 \, 756 \end{array}$$

$$\begin{array}{r} 13. \quad \$6.72 \\ \times 38 \\ \hline \$255.36 \end{array}$$

$$\begin{array}{r} 14. \quad \$5.08 \\ \times 47 \\ \hline \$238.76 \end{array}$$

$$\begin{array}{r} 15. \quad \$8.99 \\ \times 18 \\ \hline \$161.82 \end{array}$$

$$\begin{array}{r} 16. \quad \$9.05 \\ \times 75 \\ \hline \$678.75 \end{array}$$

Unit 6

Abracadabra

Find four answers that are the same. Unscramble the letters of these answers to make a word. Find other sets of answers that are the same. Make a word with the letters of each set. Then make a sentence with the words **GOOD FOR YOU**



UNIT 6

PREVIEW

Suggestions

Discuss the scene illustrated on pages 120 and 121.

Ask the students if they think this form of entertainment exists today. Lead a discussion about forms of entertainment which exist today that were unheard of 100 years ago.

About the Page

For the more complex multiplication and division problems of this unit, it is essential that the students have facility with the addition, subtraction, multiplication, and division skills presented on page 121. Before the page is done, have individual students work one of each of the four kinds of problems at the chalkboard. Review the steps involved for each. Model problems with number blocks, if necessary.

The students should do the problems on page 121 on their own. The code is a self-checking device.

Any student having difficulty with one or more of the four operations should be given special help to ensure their success with this unit.

Reinforcement

1. Provide flash card drills of the basic addition, subtraction, multiplication, and division facts. Students can work in pairs flashing cards for each other.

2. Write problems similar to those on page 121 on small pieces of paper. Play a team game in which two students from opposing teams draw a problem and race to correctly complete it at the chalkboard. The first student finished and correct earns a point for his or her team.

- Divide.
- | | | | |
|---------------|---------------|---------------|---------------|
| 17. 29) 253 | 18. 41) 149 | 19. 84) 255 | 20. 69) 576 |
| 21. 72) 655 | 22. 98) 784 | 23. 43) 409 | 24. 18) 162 |
| 25. 60) 340 | 26. 30) 2900 | 27. 80) 3750 | 28. 50) 3900 |
| 29. 22) 358 | 30. 79) 1652 | 31. 43) 3959 | 32. 28) 1216 |
| 33. 67) 5148 | 34. 93) 8209 | 35. 56) 4872 | 36. 85) 6421 |

Solve **\$85.00/month**

37. One year Mary earned \$1020.00 babysitting. Her brother earned \$215 cutting lawns that year. About how much did Mary earn each month?

Objective A26

Multiply a three-digit multiple of ten by a two-digit number.

Introducing the Lesson

Review multiplying by multiples of ten with these examples.

25	25	41	41
$\times 2$	$\times 20$	$\times 3$	$\times 30$
<hr/>	<hr/>	<hr/>	<hr/>
50	500	123	1230

Discuss the pattern of adding on a zero (or moving the decimal point one place to the right) as you multiply by a multiple of ten.

Teaching the Lesson

Read and discuss the problem at the top of page 122. Draw a diagram on the chalkboard, if necessary, to explain why multiplication is needed to solve this problem. Explain the place-value aspect of the required multiplication.

$$\begin{array}{|c|} \hline 280 \\ \times 12 \\ \hline \end{array} = \begin{array}{|c|} \hline 280 \\ \times 2 \\ \hline 560 \end{array} + \begin{array}{|c|} \hline 280 \\ \times 10 \\ \hline 2800 \end{array} = 3360$$

Since $12 = 10 + 2$, we first multiply 2×280 and then multiply 10×280 . Record the multiplication vertically.

$$\begin{array}{r} 280 \\ \times 12 \\ \hline 560 \quad (2 \times 280) \\ 2800 \quad (10 \times 280) \\ \hline 3360 \end{array}$$

As another way of solving the problem, have the students multiply 28×12 and then apply the rule for adding on one zero when multiplying by a multiple of ten.

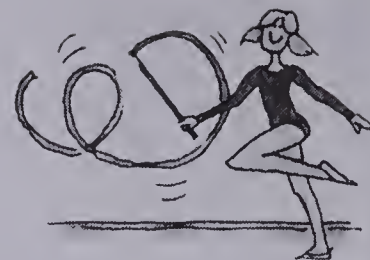
If:
$$\begin{array}{r} 28 \\ \times 12 \\ \hline 56 \\ 280 \\ \hline 336 \end{array}$$

Then:
$$\begin{array}{r} 280 \\ \times 12 \\ \hline 3360 \end{array}$$

Provide practice with several other similar problems on graph paper to help the students align the numerals properly.

Multiples of Ten

At a school talent show, 12 gymnasts did a rhythm routine with streamers. Each of the gymnasts had a streamer 280 cm long. How many centimetres of streamers did the team need?



Multiply
 $2 \times 280.$

Multiply
 $1 \text{ ten} \times 280.$

Add.

280
 $\times 12$

280
 $\times 12$
 560

280
 $\times 12$
 560
 2800

280
 $\times 12$
 560
 2800
 3360

280
 $\times 12$
 560
 2800
 3360

The team needed 3360 cm of streamers.

EXERCISES

Multiply.

1.	600	2.	600	3.	610	4.	610	5.	610
	$\times 4$		$\times 80$		$\times 4$		$\times 80$		$\times 84$
	<u>2400</u>		<u>48 000</u>		<u>2440</u>		<u>48 800</u>		<u>51 240</u>
6.	200	7.	200	8.	280	9.	280	10.	280
	$\times 2$		$\times 30$		$\times 2$		$\times 30$		$\times 32$
	<u>400</u>		<u>6000</u>		<u>560</u>		<u>8400</u>		<u>8960</u>
11.	700	12.	700	13.	730	14.	730	15.	730
	$\times 8$		$\times 50$		$\times 8$		$\times 50$		$\times 58$
	<u>5600</u>		<u>35 000</u>		<u>5840</u>		<u>36 500</u>		<u>42 340</u>
16.	190	17.	420	18.	810	19.	980	20.	550
	$\times 73$		$\times 79$		$\times 57$		$\times 36$		$\times 49$
	<u>13 870</u>		<u>33 180</u>		<u>46 170</u>		<u>35 280</u>		<u>26 950</u>

122

Using the Exercises

- Each of the first three rows of questions leads the students to the product of a two-digit number and a three-digit multiple of ten. In each row there is a preliminary step with the multiple of ten rounded to the nearest hundred. This should enable students to estimate whether the partial products are reasonable.
- Questions 16 to 20 are mixed practice. Provide graph paper for those students having difficulty with numeral alignment.

		3	2	0
×		4	2	
		6	4	0
1	2	8	0	0
1	3	4	4	0

PRACTICE

Multiply.

1. $\begin{array}{r} 510 \\ \times 25 \\ \hline 12\ 750 \end{array}$
2. $\begin{array}{r} 620 \\ \times 63 \\ \hline 39\ 060 \end{array}$
3. $\begin{array}{r} 490 \\ \times 47 \\ \hline 23\ 030 \end{array}$
4. $\begin{array}{r} 730 \\ \times 85 \\ \hline 62\ 050 \end{array}$
5. $\begin{array}{r} 380 \\ \times 91 \\ \hline 34\ 580 \end{array}$
6. $\begin{array}{r} 170 \\ \times 87 \\ \hline 14\ 790 \end{array}$
7. $\begin{array}{r} 350 \\ \times 96 \\ \hline 33\ 600 \end{array}$
8. $\begin{array}{r} 680 \\ \times 50 \\ \hline 34\ 000 \end{array}$
9. $\begin{array}{r} 920 \\ \times 48 \\ \hline 44\ 160 \end{array}$
10. $\begin{array}{r} 410 \\ \times 93 \\ \hline 38\ 130 \end{array}$
11. $\begin{array}{r} 370 \\ \times 37 \\ \hline 13\ 690 \end{array}$
12. $\begin{array}{r} 290 \\ \times 55 \\ \hline 15\ 950 \end{array}$
13. $\begin{array}{r} 950 \\ \times 60 \\ \hline 57\ 000 \end{array}$
14. $\begin{array}{r} 640 \\ \times 82 \\ \hline 52\ 480 \end{array}$
15. $\begin{array}{r} 580 \\ \times 78 \\ \hline 45\ 240 \end{array}$
16. $15 \times 100 = 1500$
17. $22 \times 300 = 6600$
18. $50 \times 110 = 5500$
19. $40 \times 200 = 8000$
20. $80 \times 700 = 56\ 000$
21. $20 \times 450 = 9000$

Solve.

22. The Grade 5 class made 250 programs for the talent show. The programs cost 15¢ each. What was the total cost of the programs? **\$37.50**
23. Robbie needed a cloth to go around a table for his magic act at the talent show. He got a piece 73 cm wide and 240 cm long. How many square centimetres of cloth did he have? **17520 cm²**

What Comes Next?

Study the pattern. Copy and complete.

- a. 45 mm, 36 mm, 27 mm, **18, 9, 0**
- b. 4.4 cm, 4.6 cm, 4.8 cm, **5.0, 5.2, 5.4**
- c. 630 m, 618 m, 606 m, **594, 582, 570**
- d. 2.2 km, 2.7 km, 3.2 km, **3.7, 4.2, 4.7**
- e. 4.02 m, 4.08 m, 4.14 m, **4.20, 4.26, 4.32**
- f. 1.5 cm, 1.8 cm, 2.1 cm, **2.4, 2.7, 3.0**



123

Assigning the Practice

Minimum: 1-15, 22

Average: 4-22

Enriched: 5-23

Reinforcement

1. Write the following problems on the chalkboard for the students to solve. Since the second factor is the same in each group, students can concentrate on procedure and need not know as many multiplication facts.

a. $\begin{array}{r} 330 \\ \times 31 \\ \hline \end{array}$ $\begin{array}{r} 650 \\ \times 31 \\ \hline \end{array}$ $\begin{array}{r} 920 \\ \times 31 \\ \hline \end{array}$

b. $\begin{array}{r} 220 \\ \times 42 \\ \hline \end{array}$ $\begin{array}{r} 730 \\ \times 42 \\ \hline \end{array}$ $\begin{array}{r} 860 \\ \times 42 \\ \hline \end{array}$

c. $\begin{array}{r} 190 \\ \times 80 \\ \hline \end{array}$ $\begin{array}{r} 670 \\ \times 80 \\ \hline \end{array}$ $\begin{array}{r} 350 \\ \times 80 \\ \hline \end{array}$

2. Ask the students to complete the following cross-number multiplication puzzles.

$\begin{array}{r} \times \longrightarrow \\ \downarrow \\ \begin{array}{|c|c|c|} \hline 10 & 35 & \\ \hline 7 & 3 & \\ \hline & & \\ \hline \end{array} \end{array}$

$\begin{array}{r} \times \longrightarrow \\ \downarrow \\ \begin{array}{|c|c|c|} \hline 10 & 67 & \\ \hline 8 & 5 & \\ \hline & & \\ \hline \end{array} \end{array}$

$\begin{array}{r} \times \longrightarrow \\ \downarrow \\ \begin{array}{|c|c|c|} \hline 10 & 53 & \\ \hline 8 & 9 & \\ \hline & & \\ \hline \end{array} \end{array}$

$\begin{array}{r} \times \longrightarrow \\ \downarrow \\ \begin{array}{|c|c|c|} \hline 10 & 82 & \\ \hline 4 & 7 & \\ \hline & & \\ \hline \end{array} \end{array}$

3. Have the students round each factor to the first digit (at the left) and write the estimated product.

- a. 410×39 b. 650×24

Enrichment

1. Assign *What Comes Next?* at the bottom of page 123.

2. Have the students make a paper streamer that is 280 cm long (as mentioned at the top of page 122). Ask them to write its length also in metres and in millimetres.

Extra Practice

Find the product.

1. $\begin{array}{r} 430 \\ \times 25 \\ \hline 10\ 750 \end{array}$
2. $\begin{array}{r} 520 \\ \times 43 \\ \hline 22\ 360 \end{array}$
3. $\begin{array}{r} 650 \\ \times 37 \\ \hline 24\ 050 \end{array}$
4. $\begin{array}{r} 390 \\ \times 56 \\ \hline 21\ 840 \end{array}$
5. $\begin{array}{r} 280 \\ \times 35 \\ \hline 9800 \end{array}$
6. $\begin{array}{r} 360 \\ \times 50 \\ \hline 18\ 000 \end{array}$
7. $\begin{array}{r} 340 \\ \times 62 \\ \hline 21\ 080 \end{array}$
8. $\begin{array}{r} 720 \\ \times 38 \\ \hline 27\ 360 \end{array}$
9. $\begin{array}{r} 670 \\ \times 69 \\ \hline 46\ 230 \end{array}$
10. $\begin{array}{r} 850 \\ \times 84 \\ \hline 71\ 400 \end{array}$

Solve.

11. Sylvia made 13 seed pictures. She used about 380 seeds for each picture. About how many seeds did she use in all? **4940**
12. An arena has 450 box seats. The tickets for these seats cost \$12 each. All the box seats are sold for a hockey game. How much money has been taken in for the box seats? **\$5400**

Worksheet A26

Pages 122-123

UNIT 6 LESSON 2

Objective A27

Estimate the product of a three-digit and a two-digit number.

Introducing the Lesson

Review rounding these numbers to the nearest ten. Recall that if the number to the right of the number in the tens place is 5 or more, the number in the tens place is increased by one and the ones place number becomes a zero. If the number to the right of the number in the tens place is less than 5, the tens place number stays the same and the ones place number becomes a zero.

62 rounds down to 60 38 rounds up to 40

25 rounds up to 30 83 rounds down to 80

Now review rounding three-digit numbers to the nearest hundred.

Teaching the Lesson

Provide a quick mental multiplication drill. Say several problems, e.g., 500×30 , 200×90 , 400×80 , etc. and have the students calculate the products without paper and pencil.

Read and discuss the problem at the top of page 124. Point out that each factor is rounded before being multiplied. Have a student use a calculator to find the actual product of 38 and 109. Compare the estimated and the actual products.

Actual Product: 4142
Estimated Product: 4000

The estimate is *less than* the actual product. Further examples, like 54×365 , should be taken to show that the estimate can also be *more than* the actual product. The students should be aware that an estimate is an approximate number, either greater than or less than the actual number, but reasonably close to it.

Estimating Products

Janet counted 38 children at the roller rink one afternoon. Each child went around the rink about 109 times before the rental time was up. How many laps was that in all? Estimate the answer.



Estimate: 38 rounded to the nearest ten is 40
109 rounded to the nearest hundred is 100.
 $40 \times 100 = 4000$

The total number of laps was about 4000.

EXERCISES

What is the product?

- | | | | |
|------------------------|----------------------------|-------------------------|----------------------------|
| 1. 3×400 200 | 2. 30×400 12 000 | 3. 5×500 2500 | 4. 50×500 25 000 |
| 5. 6×800 4800 | 6. 60×800 48 000 | 7. 9×700 6300 | 8. 90×700 63 000 |
| 9. 8×300 2400 | 10. 80×300 24 000 | 11. 4×500 2000 | 12. 40×500 20 000 |

Round to the nearest ten

- | | | | | |
|-----------|-----------|-----------|-----------|------------|
| 13. 53 50 | 14. 61 60 | 15. 78 80 | 16. 73 70 | 17. 95 100 |
|-----------|-----------|-----------|-----------|------------|

Round to the nearest hundred.

- | | | | | |
|-------------|-------------|-------------|-------------|-------------|
| 18. 310 300 | 19. 408 400 | 20. 572 600 | 21. 507 500 | 22. 895 900 |
|-------------|-------------|-------------|-------------|-------------|

Estimate the product.

- | | | | | |
|---|---|---|---|---|
| 23. $\begin{array}{r} 310 \\ \times 53 \\ \hline 15\ 000 \end{array}$ | 24. $\begin{array}{r} 408 \\ \times 61 \\ \hline 24\ 000 \end{array}$ | 25. $\begin{array}{r} 572 \\ \times 78 \\ \hline 48\ 000 \end{array}$ | 26. $\begin{array}{r} 507 \\ \times 73 \\ \hline 35\ 000 \end{array}$ | 27. $\begin{array}{r} 895 \\ \times 95 \\ \hline 90\ 000 \end{array}$ |
| 28. $\begin{array}{r} 625 \\ \times 88 \\ \hline 54\ 000 \end{array}$ | 29. $\begin{array}{r} 799 \\ \times 22 \\ \hline 16\ 000 \end{array}$ | 30. $\begin{array}{r} 589 \\ \times 34 \\ \hline 18\ 000 \end{array}$ | 31. $\begin{array}{r} 879 \\ \times 49 \\ \hline 45\ 000 \end{array}$ | 32. $\begin{array}{r} 293 \\ \times 58 \\ \hline 18\ 000 \end{array}$ |
| 33. $\begin{array}{r} 540 \\ \times 28 \\ \hline 15\ 000 \end{array}$ | 34. $\begin{array}{r} 886 \\ \times 57 \\ \hline 54\ 000 \end{array}$ | 35. $\begin{array}{r} 317 \\ \times 82 \\ \hline 24\ 000 \end{array}$ | 36. $\begin{array}{r} 492 \\ \times 31 \\ \hline 15\ 000 \end{array}$ | 37. $\begin{array}{r} 741 \\ \times 36 \\ \hline 28\ 000 \end{array}$ |

124

Using the Exercises

- Questions 1 to 12 are in pairs. They help the students estimate the product of a multiple of a hundred and a multiple of ten by first multiplying the multiple of a hundred by a single digit.
- Questions 13 to 22 review rounding so that the students will have little trouble with that step when they estimate products.
- Questions 23 to 37 provide practice in estimating the product of a two-digit number and a three-digit number.

PRACTICE

Round to the nearest ten.

1. 53 **50** 2. 85 **90** 3. 31 **30** 4. 67 **70** 5. 98 **100**

Round to the nearest hundred.

6. 672 **700** 7. 435 **400** 8. 705 **700** 9. 550 **600** 10. 909 **900**

Estimate the product.

11. $\begin{array}{r} 672 \\ \times 53 \\ \hline \end{array}$ **35 000** 12. $\begin{array}{r} 435 \\ \times 85 \\ \hline \end{array}$ **36 000** 13. $\begin{array}{r} 705 \\ \times 31 \\ \hline \end{array}$ **21 000** 14. $\begin{array}{r} 550 \\ \times 67 \\ \hline \end{array}$ **42 000** 15. $\begin{array}{r} 909 \\ \times 92 \\ \hline \end{array}$ **90 000**
16. $\begin{array}{r} 291 \\ \times 36 \\ \hline \end{array}$ **12 000** 17. $\begin{array}{r} 335 \\ \times 52 \\ \hline \end{array}$ **15 000** 18. $\begin{array}{r} 407 \\ \times 78 \\ \hline \end{array}$ **32 000** 19. $\begin{array}{r} 872 \\ \times 56 \\ \hline \end{array}$ **54 000** 20. $\begin{array}{r} 108 \\ \times 43 \\ \hline \end{array}$ **4 000**

Estimate the answer.

21. Watkin's Roller Rink rents skates by the hour. They have 120 pairs of skates to rent. Last week they rented all their skates for each of the 28 h they were open. How many hours of skate use was that? **3360 h**
22. Rented skates at Watkin's cost \$1.20 an hour. If 75 people rent skates, how much money will be collected in an hour? **\$90.00**

Check Stop

	Add the digits in each number	Add the digits again	
256	$2 + 5 + 6 = 13$	$1 + 3 = 4$	Multiply these $4 \times 1 = 4$
$\times 28$	$2 + 8 = 10$	$1 + 0 = 1$	
7168	$7 + 1 + 6 + 8 = 22$	$2 + 2 = 4$	Compare. These numbers should be the same.

Check your answers to problems 16 to 20 above, using this method.

Note: If the product in the checking process has two digits, add these digits before you compare.

$$\begin{array}{l} 3 \times 4 = 12 \\ 1 + 2 = 3 \end{array}$$

125

Assigning the Practice

Minimum: 1-15, 21

Average: 1-22

Enriched: 1-22

Reinforcement

1. Have the students complete this rounding table.

	rounded to the nearest ten	rounded to the nearest hundred
317		
256		
475		
849		
982		

2. Ask the students to use comparison signs, $>$ and $<$, to complete these statements.

- a. 4×900 • 50×70
b. 80×60 • 7×700
c. 60×400 • 30×800
d. 40×400 • 4000×4
e. 700×30 • 5000×4

3. Play a two-team estimating game. Make a set of two-digit and a set of three-digit numeral cards. Players, in turn, form alternating teams, turn up one of each kind of card and estimate the product. If the estimate is correct, a point is earned for his or her team. The team with the most points wins.

Enrichment

1. Before assigning *Check Stop* at the bottom of page 125, explain the checking procedure with a few chalkboard examples.
2. Ask the students to estimate the number of students in their school.

Extra Practice

Estimate the product.

1. $\begin{array}{r} 509 \\ \times 33 \\ \hline \end{array}$ **15 000** 2. $\begin{array}{r} 691 \\ \times 42 \\ \hline \end{array}$ **28 000** 3. $\begin{array}{r} 750 \\ \times 50 \\ \hline \end{array}$ **40 000** 4. $\begin{array}{r} 482 \\ \times 63 \\ \hline \end{array}$ **30 000** 5. $\begin{array}{r} 866 \\ \times 57 \\ \hline \end{array}$ **54 000**
6. $\begin{array}{r} 341 \\ \times 28 \\ \hline \end{array}$ **9 000** 7. $\begin{array}{r} 856 \\ \times 67 \\ \hline \end{array}$ **63 000** 8. $\begin{array}{r} 908 \\ \times 59 \\ \hline \end{array}$ **54 000** 9. $\begin{array}{r} 608 \\ \times 78 \\ \hline \end{array}$ **48 000** 10. $\begin{array}{r} 319 \\ \times 81 \\ \hline \end{array}$ **24 000**

Estimate the answer.

11. Eric's stride is 58 cm long. How far does he go in 240 strides? **about 12 000 cm or 12 m**
12. Alice does about 45 min of homework a night. If she does homework 120 nights in the school year, how many minutes of homework will she do? **about 5000 min**

Worksheet A27

Pages 124 - 125

Objective A28

Multiply a three-digit number by a two-digit number.

Introducing the Lesson

Read the problem at the top of page 126. Have the students *estimate* the product.

$$\begin{array}{r} 256 \longrightarrow 300 \\ \times 28 \longrightarrow \times 30 \\ \hline 9000 \end{array}$$

They made about 9000 mL of jam.

Compare the estimate to the actual product.

Show a ketchup and a ginger ale bottle. Note the amount of millilitres each contains. Have the students estimate the number of millilitres there would be in a case of each.

Teaching the Lesson

Explain the place-value aspect of the multiplication at the top of page 126.

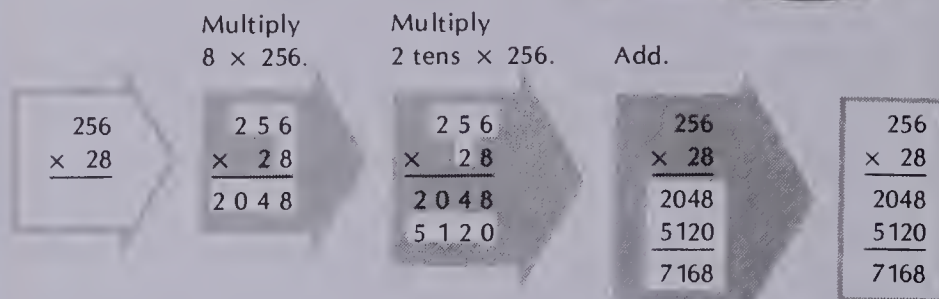
$$\begin{array}{r} 256 \\ \times 28 \\ \hline 2048 \quad (8 \times 256) \\ 5120 \quad (20 \times 256) \\ \hline 7168 \end{array}$$

Refer the students to the *checking* procedure at the bottom of page 125. Note that it is the lesson example from page 126 that is being checked on page 125.

Ask several students to come to the chalkboard to multiply similar problems while the rest of the class works on paper. Encourage all of them to *estimate* their products first and then to *check* their results by the method described on page 125.

Two-Digit Multipliers

Michael helped his mother make 28 jars of raspberry jam for the Red Lake Fair. Each jar contained 256 mL of jam. How much jam did they make to fill the jars?



They made 7168 mL of jam to fill the jars.

EXERCISES

Multiply.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 321 \\ \times 2 \\ \hline 642 \end{array}$ | 2. $\begin{array}{r} 321 \\ \times 40 \\ \hline 12840 \end{array}$ | 3. $\begin{array}{r} 321 \\ \times 42 \\ \hline 13482 \end{array}$ | 4. $\begin{array}{r} 429 \\ \times 3 \\ \hline 1287 \end{array}$ | 5. $\begin{array}{r} 429 \\ \times 20 \\ \hline 8580 \end{array}$ |
| 6. $\begin{array}{r} 429 \\ \times 23 \\ \hline 9867 \end{array}$ | 7. $\begin{array}{r} 692 \\ \times 7 \\ \hline 4844 \end{array}$ | 8. $\begin{array}{r} 692 \\ \times 10 \\ \hline 6920 \end{array}$ | 9. $\begin{array}{r} 692 \\ \times 17 \\ \hline 11764 \end{array}$ | 10. $\begin{array}{r} 185 \\ \times 4 \\ \hline 740 \end{array}$ |
| 11. $\begin{array}{r} 185 \\ \times 80 \\ \hline 14800 \end{array}$ | 12. $\begin{array}{r} 185 \\ \times 84 \\ \hline 15540 \end{array}$ | 13. $\begin{array}{r} 573 \\ \times 6 \\ \hline 3438 \end{array}$ | 14. $\begin{array}{r} 573 \\ \times 90 \\ \hline 51570 \end{array}$ | 15. $\begin{array}{r} 573 \\ \times 96 \\ \hline 55008 \end{array}$ |
| 16. $\begin{array}{r} 268 \\ \times 45 \\ \hline 12060 \end{array}$ | 17. $\begin{array}{r} 917 \\ \times 27 \\ \hline 24759 \end{array}$ | 18. $\begin{array}{r} 182 \\ \times 63 \\ \hline 11466 \end{array}$ | 19. $\begin{array}{r} 704 \\ \times 92 \\ \hline 64768 \end{array}$ | 20. $\begin{array}{r} 850 \\ \times 58 \\ \hline 49300 \end{array}$ |

Using the Exercises

- Questions 1 to 15 develop a multiplication with a set of three exercises (multiply by ones, by tens, and then by ones and tens).
- Questions 16 to 20 are mixed practice. Provide graph paper for those students having difficulty with numeral alignment.

PRACTICE

Find the product.

1. $\begin{array}{r} 213 \\ \times 32 \\ \hline 6816 \end{array}$
2. $\begin{array}{r} 402 \\ \times 43 \\ \hline 17286 \end{array}$
3. $\begin{array}{r} 512 \\ \times 24 \\ \hline 12288 \end{array}$
4. $\begin{array}{r} 620 \\ \times 43 \\ \hline 26660 \end{array}$
5. $\begin{array}{r} 422 \\ \times 23 \\ \hline 9706 \end{array}$
6. $\begin{array}{r} 137 \\ \times 12 \\ \hline 1644 \end{array}$
7. $\begin{array}{r} 326 \\ \times 33 \\ \hline 10758 \end{array}$
8. $\begin{array}{r} 415 \\ \times 42 \\ \hline 17430 \end{array}$
9. $\begin{array}{r} 524 \\ \times 34 \\ \hline 17816 \end{array}$
10. $\begin{array}{r} 213 \\ \times 45 \\ \hline 9585 \end{array}$
11. $\begin{array}{r} 154 \\ \times 34 \\ \hline 5236 \end{array}$
12. $\begin{array}{r} 267 \\ \times 23 \\ \hline 6141 \end{array}$
13. $\begin{array}{r} 364 \\ \times 45 \\ \hline 16380 \end{array}$
14. $\begin{array}{r} 453 \\ \times 64 \\ \hline 28992 \end{array}$
15. $\begin{array}{r} 545 \\ \times 46 \\ \hline 25070 \end{array}$
16. $54 \times 548 = 29592$
17. $67 \times 763 = 51121$
18. $84 \times 869 = 72996$

Solve. Check your answers by estimation.

19. Apple cider was sold in 175 mL cups. If Lori sold 65 cups, how much cider did she sell? $11\,375\text{ mL}$
20. A refreshment stand at the fair ordered 125 boxes of donuts. There were a dozen donuts in each box. How many donuts did they order? 1500
21. A Fiddling Contest was watched by 345 people who paid 75¢ to sit in the grandstand. What was the total amount paid? $\$258.75$

Fruit Basket

The fruit stand at the fair sells apples for 20¢ each, oranges for 30¢ each, and pears for 25¢ each. List the different ways that you can spend exactly \$1 for fruit.

Apples	Oranges	Pears
5	0	0
0	0	4
2	2	0
1	1	2



127

Extra Practice

Multiply.

1. $\begin{array}{r} 312 \\ \times 23 \\ \hline 7176 \end{array}$
2. $\begin{array}{r} 502 \\ \times 34 \\ \hline 17068 \end{array}$
3. $\begin{array}{r} 422 \\ \times 43 \\ \hline 18146 \end{array}$
4. $\begin{array}{r} 713 \\ \times 64 \\ \hline 45632 \end{array}$
5. $\begin{array}{r} 835 \\ \times 46 \\ \hline 38410 \end{array}$
6. $\begin{array}{r} 215 \\ \times 34 \\ \hline 7310 \end{array}$
7. $\begin{array}{r} 324 \\ \times 42 \\ \hline 13608 \end{array}$
8. $\begin{array}{r} 635 \\ \times 22 \\ \hline 13970 \end{array}$
9. $\begin{array}{r} 908 \\ \times 52 \\ \hline 47216 \end{array}$
10. $\begin{array}{r} 545 \\ \times 19 \\ \hline 10355 \end{array}$

Solve.

11. Pigs averaging 160 kg each were auctioned off at the Fair. If 38 pigs were sold, what was their total mass? 6080 kg
12. Fifteen children bought bags of marbles. There were about 125 marbles in each bag. About how many marbles did the children have? 1875

Assigning the Practice

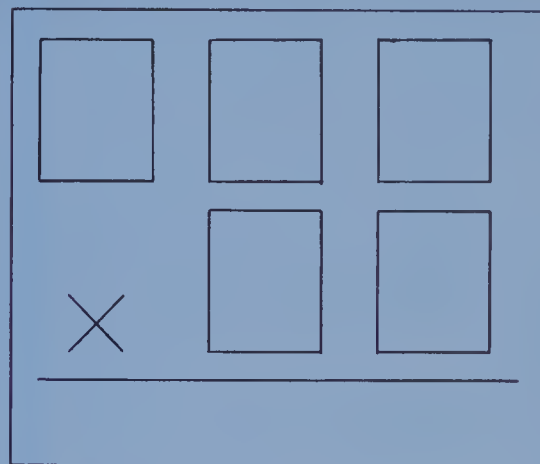
Minimum: 1-19

Average: 3-21

Enriched: 3-21

Reinforcement

1. Play this multiplication game for up to four players. Make one game board for each player.



Prepare four numeral cards for each of the ten digits (0-9) for each player. Players first set a target number, such as 30 000. In turn, players draw a card and place it over a blank square on the game board. When all five blanks are covered, players compute the product. The player whose product is closest to the target number wins.

2. Have the students bring in several food containers. Display them with labels stating their capacities or masses. Ask the students to find how many millilitres or milligrams of each type of food there would be in a case of 24 items.

3. Ask the students to check their multiplications on page 127 by the method described at the bottom of page 125.

Enrichment

1. Assign *Fruit Basket* at the bottom of page 127.
2. Have the students complete the following equations.
 - a. $210 \times (50 + 5) = (210 \times \blacksquare) + (210 \times 5)$
 - b. $320 \times (\blacksquare + 4) = (320 \times 30) + (320 \times 4)$
 - c. $540 \times (60 + 2) = (540 \times \blacksquare) + (540 \times \blacksquare)$
 - d. $\blacksquare \times (\blacksquare + \blacksquare) = (990 \times 20) + (990 \times 3)$

Worksheet A28

Pages 126 - 127

Objective M13

Multiply money.

Introducing the Lesson

Write the words addition, subtraction, multiplication, and division on the chalkboard. Ask the students, "Which of these operations do you think is used most in stores in buying things?" Ask them to give examples to support their answers. Ask some students to make up problems involving money and multiplication.

Teaching the Lesson

Display a few popular boxed games along with their individual prices. Ask the students to compute the cost of from 2 to 9 of them to review multiplying money by a one-digit number.

Read and discuss the problem at the top of page 128. Write the required multiplication on the chalkboard and discuss the steps necessary to find the product.

$$\begin{array}{r} 959 \\ \times 12 \\ \hline 1918 \\ 9590 \\ \hline 11508 \end{array}$$

(2 × 959)
(10 × 959)

Write the multiplication in dollars and cents on the chalkboard. *Estimate* the product.

$$\begin{array}{r} \$9.59 \rightarrow \$10 \\ \times 12 \\ \hline \$120 \end{array}$$

Twelve games cost about \$120. Show how the actual cost of the 12 games is computed. Stress the placement of the decimal point in the product.

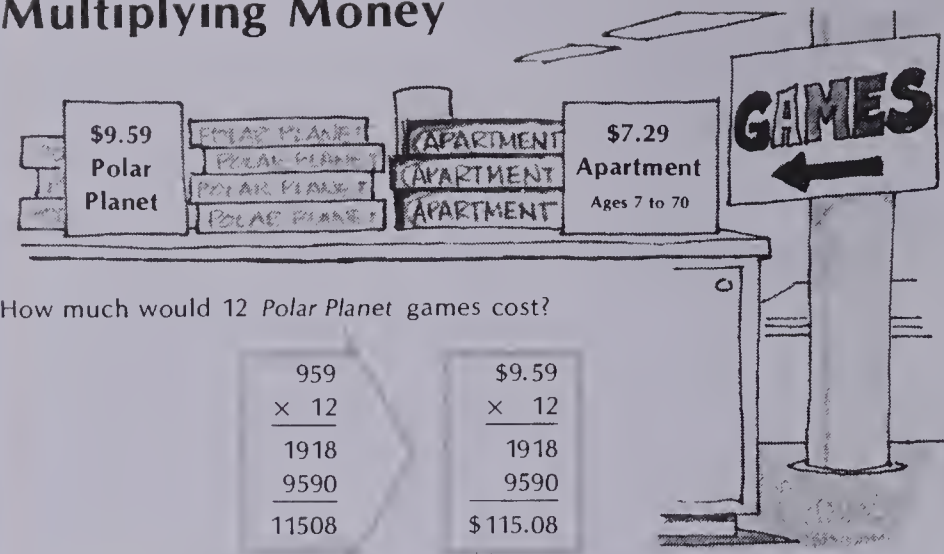
$$\begin{array}{r} \$9.59 \text{ Two decimal places} \\ \times 12 \text{ are in the factors.} \\ \hline 1918 \\ 9590 \\ \hline \$115.08 \end{array}$$

Thus, two decimal places are in the product.

Point out also the necessity for writing the dollar sign with the product to indicate that it is money.

Note how close the estimate came to the actual cost of twelve games.

Multiplying Money



How much would 12 *Polar Planet* games cost?

$$\begin{array}{r} 959 \\ \times 12 \\ \hline 1918 \\ 9590 \\ \hline 11508 \end{array}$$
$$\begin{array}{r} \$9.59 \\ \times 12 \\ \hline 1918 \\ 9590 \\ \hline \$115.08 \end{array}$$

Twelve *Polar Planet* games would cost \$115.08.

EXERCISES

Multiply.

- | | | | | |
|---|---|---|---|---|
| 1. $\begin{array}{r} 145 \\ \times 3 \\ \hline 435 \end{array}$ | 2. $\begin{array}{r} \$1.45 \\ \times 3 \\ \hline \$4.35 \end{array}$ | 3. $\begin{array}{r} 256 \\ \times 5 \\ \hline 1280 \end{array}$ | 4. $\begin{array}{r} \$2.56 \\ \times 5 \\ \hline \$12.80 \end{array}$ | 5. $\begin{array}{r} \$7.27 \\ \times 6 \\ \hline \$43.62 \end{array}$ |
| 6. $\begin{array}{r} 273 \\ \times 30 \\ \hline 8190 \end{array}$ | 7. $\begin{array}{r} \$2.73 \\ \times 30 \\ \hline \$81.90 \end{array}$ | 8. $\begin{array}{r} 963 \\ \times 40 \\ \hline 38520 \end{array}$ | 9. $\begin{array}{r} \$9.63 \\ \times 40 \\ \hline \$385.20 \end{array}$ | 10. $\begin{array}{r} \$8.42 \\ \times 50 \\ \hline \$421.00 \end{array}$ |
| 11. $\begin{array}{r} 195 \\ \times 47 \\ \hline 9165 \end{array}$ | 12. $\begin{array}{r} \$1.95 \\ \times 47 \\ \hline \$91.65 \end{array}$ | 13. $\begin{array}{r} 308 \\ \times 91 \\ \hline 28028 \end{array}$ | 14. $\begin{array}{r} \$3.08 \\ \times 91 \\ \hline \$280.28 \end{array}$ | 15. $\begin{array}{r} \$7.50 \\ \times 83 \\ \hline \$622.50 \end{array}$ |
| 16. $\begin{array}{r} \$4.83 \\ \times 25 \\ \hline \$120.75 \end{array}$ | 17. $\begin{array}{r} \$5.06 \\ \times 30 \\ \hline \$151.80 \end{array}$ | 18. $\begin{array}{r} \$9.24 \\ \times 50 \\ \hline \$462.00 \end{array}$ | 19. $\begin{array}{r} \$7.84 \\ \times 17 \\ \hline \$133.28 \end{array}$ | 20. $\begin{array}{r} \$8.09 \\ \times 33 \\ \hline \$266.97 \end{array}$ |
| 21. $\begin{array}{r} \$5.74 \\ \times 17 \\ \hline \$97.58 \end{array}$ | 22. $\begin{array}{r} \$6.23 \\ \times 43 \\ \hline \$267.89 \end{array}$ | 23. $\begin{array}{r} \$3.57 \\ \times 65 \\ \hline \$232.05 \end{array}$ | 24. $\begin{array}{r} \$4.64 \\ \times 28 \\ \hline \$129.92 \end{array}$ | 25. $\begin{array}{r} \$8.17 \\ \times 89 \\ \hline \$727.13 \end{array}$ |

Using the Exercises

- Questions 1 to 15 are developmentally arranged in pairs so that the student first completes the multiplication and then considers the placement of the dollar sign and decimal point.
- Questions 16 to 25 require proper numeral alignment and placement of the dollar sign and decimal point. Encourage estimation and the checking (page 125) of products.

PRACTICE

Multiply.

1. $\begin{array}{r} \$0.55 \\ \times 4 \\ \hline \$2.20 \end{array}$
2. $\begin{array}{r} \$0.63 \\ \times 6 \\ \hline \$3.78 \end{array}$
3. $\begin{array}{r} \$0.45 \\ \times 10 \\ \hline \$4.50 \end{array}$
4. $\begin{array}{r} \$0.78 \\ \times 10 \\ \hline \$7.80 \end{array}$
5. $\begin{array}{r} \$1.35 \\ \times 10 \\ \hline \$13.50 \end{array}$
6. $\begin{array}{r} \$4.25 \\ \times 20 \\ \hline \$85.00 \end{array}$
7. $\begin{array}{r} \$5.77 \\ \times 24 \\ \hline \$138.48 \end{array}$
8. $\begin{array}{r} \$6.79 \\ \times 30 \\ \hline \$203.70 \end{array}$
9. $\begin{array}{r} \$8.45 \\ \times 33 \\ \hline \$278.85 \end{array}$
10. $\begin{array}{r} \$6.82 \\ \times 50 \\ \hline \$341.00 \end{array}$
11. $\begin{array}{r} \$9.32 \\ \times 70 \\ \hline \$652.40 \end{array}$
12. $\begin{array}{r} \$8.47 \\ \times 77 \\ \hline \$652.19 \end{array}$
13. $\begin{array}{r} \$9.32 \\ \times 35 \\ \hline \$326.20 \end{array}$
14. $\begin{array}{r} \$4.82 \\ \times 51 \\ \hline \$245.82 \end{array}$
15. $\begin{array}{r} \$7.13 \\ \times 25 \\ \hline \$178.25 \end{array}$

Solve.

16. One *Apartment* game costs \$7.29. How much would 20 of them cost?
 $\$145.80$
17. The West Side Recreation Club bought 3 dart games. Each game cost \$15.32. What was the total cost?
 $\$45.96$

REVIEW

Multiply.

- A26 1. $\begin{array}{r} 230 \\ \times 65 \\ \hline 14950 \end{array}$
2. $\begin{array}{r} 480 \\ \times 37 \\ \hline 17760 \end{array}$
3. $\begin{array}{r} 810 \\ \times 46 \\ \hline 37260 \end{array}$
4. $\begin{array}{r} 650 \\ \times 73 \\ \hline 47450 \end{array}$

Estimate the product.

- A27 5. $\begin{array}{r} 320 \\ \times 51 \\ \hline 15000 \end{array}$
6. $\begin{array}{r} 804 \\ \times 49 \\ \hline 40000 \end{array}$
7. $\begin{array}{r} 688 \\ \times 33 \\ \hline 21000 \end{array}$
8. $\begin{array}{r} 592 \\ \times 67 \\ \hline 42000 \end{array}$

Multiply.

- A28 9. $\begin{array}{r} 267 \\ \times 43 \\ \hline 11481 \end{array}$
10. $\begin{array}{r} 816 \\ \times 28 \\ \hline 22848 \end{array}$
11. $\begin{array}{r} 193 \\ \times 74 \\ \hline 14282 \end{array}$
12. $\begin{array}{r} 950 \\ \times 53 \\ \hline 50350 \end{array}$
- M13 13. $\begin{array}{r} \$2.32 \\ \times 3 \\ \hline \$6.96 \end{array}$
14. $\begin{array}{r} \$6.40 \\ \times 8 \\ \hline \$51.20 \end{array}$
15. $\begin{array}{r} \$4.18 \\ \times 27 \\ \hline \$112.86 \end{array}$
16. $\begin{array}{r} \$5.97 \\ \times 74 \\ \hline \$441.78 \end{array}$

129

Assigning the Practice

Minimum: 1-16

Average: 1-16

Enriched: 1-17

Review Exercises

Questions	Objective	Pages
1-4	A26	122-123
5-8	A27	124-125
9-12	A28	126-127
13-16	M13	128-129

Reinforcement

1. Have the students choose items from a gift catalog and then compute how much it would cost to buy the items for:
 - a. all boys in class.
 - b. all girls in class.
 - c. all students in class.

2. Ask the students to *check* these products using the method described on page 125.

- a. $\begin{array}{r} \$6.45 \\ \times 35 \\ \hline \$225.75 \end{array}$
- b. $\begin{array}{r} \$9.59 \\ \times 55 \\ \hline \$528.45 \end{array}$
- c. $\begin{array}{r} \$3.68 \\ \times 42 \\ \hline \$144.56 \end{array}$
- d. $\begin{array}{r} \$8.79 \\ \times 95 \\ \hline \$835.05 \end{array}$

Enrichment

Ask the students to make these amounts *ten times*, *one hundred times*, and *one thousand times* more. Have them list their answers in a chart.

- a. \$5.95
- b. \$6.09
- c. \$47.25
- d. \$0.42
- e. \$85.89
- f. \$0.02

Extra Practice

Worksheet M13

Pages 128 - 129

Multiply.

1. $\begin{array}{r} \$1.88 \\ \times 17 \\ \hline \$31.96 \end{array}$
2. $\begin{array}{r} \$5.76 \\ \times 43 \\ \hline \$247.68 \end{array}$
3. $\begin{array}{r} \$2.38 \\ \times 65 \\ \hline \$154.70 \end{array}$
4. $\begin{array}{r} \$4.76 \\ \times 13 \\ \hline \$61.88 \end{array}$
5. $\begin{array}{r} \$6.32 \\ \times 49 \\ \hline \$309.68 \end{array}$
6. $\begin{array}{r} \$7.77 \\ \times 26 \\ \hline \$202.02 \end{array}$
7. $\begin{array}{r} \$4.87 \\ \times 85 \\ \hline \$413.95 \end{array}$
8. $\begin{array}{r} \$5.76 \\ \times 35 \\ \hline \$201.60 \end{array}$
9. $\begin{array}{r} \$9.99 \\ \times 59 \\ \hline \$589.41 \end{array}$
10. $\begin{array}{r} \$9.99 \\ \times 76 \\ \hline \$759.24 \end{array}$

Solve.

11. The Recreation Club bought 23 *Apartment* games at \$7.29 each. How much did the 23 games cost? $\$167.67$
12. Mr. Simmons bought 12 card games at \$2.98 each. How much did the games cost? $\$35.76$

Objective A29

Divide a two- or three-digit dividend by a two-digit divisor (one stage), with or without a remainder.

Introducing the Lesson

Review the two meanings of division, as studied in Unit 4.

Teaching the Lesson

Read and discuss the problem at the top of page 130. Work through the long division steps on the chalkboard.

1. Estimate.

6 36 rounds up to 40.

36)250 "How many forties are in 250? Count by forties." About six.

Point out that the estimate was that there were about 6 forties in 250, not 60 or 600. Hence, the six is placed over the zero in the ones place. If the 6 is placed over the five in the tens place, it would mean 60. If the 6 is placed over the two in the hundreds place, it would mean 600.

2. Multiply.

$$\begin{array}{r} 6 \\ 36 \overline{)250} \\ \underline{-216} \end{array}$$

3. Subtract and compare.

$$\begin{array}{r} 6 \\ 36 \overline{)250} \\ \underline{-216} \\ 34 \end{array}$$

"The remainder, 34, is less than the divisor, 36." Stress the importance of this step.

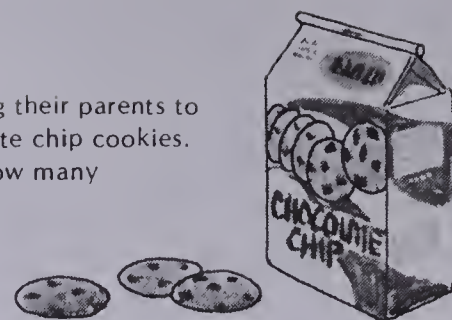
Explain how this division is checked.

$$\begin{array}{r} 36 \leftarrow \text{divisor} \\ \times 6 \leftarrow \text{quotient} \\ \hline 216 \\ + 34 \leftarrow \text{remainder} \\ \hline 250 \leftarrow \text{dividend} \end{array}$$

Have the students calculate how many of 250 chocolate chip cookies each student in their class would get.

Two-Digit Divisors

The students at Leger School are inviting their parents to a party. They want to order 250 chocolate chip cookies. The cookies come in packages of 36. How many packages should they order?



Round the divisor.
Estimate.

Multiply
and subtract.

Write the
remainder.

$$36 \overline{)250}$$

$$\begin{array}{r} 6 \\ 40 \overline{)250} \end{array}$$

$$\begin{array}{r} 6 \\ 36 \overline{)250} \\ \underline{-216} \\ 34 \end{array}$$

$$\begin{array}{r} 6R34 \\ 36 \overline{)250} \\ \underline{-216} \\ 34 \end{array}$$

They need 6 packages and 34 cookies more. They should order 7 packages.

EXERCISES

Divide.

- | | | | | |
|--|---|--|--|--|
| 1. $3 \overline{)6}$ ² | 2. $30 \overline{)60}$ ² | 3. $30 \overline{)63}$ ^{2R3} | 4. $29 \overline{)60}$ ^{2R2} | 5. $29 \overline{)63}$ ^{2R5} |
| 6. $2 \overline{)8}$ ⁴ | 7. $20 \overline{)80}$ ⁴ | 8. $20 \overline{)85}$ ^{4R5} | 9. $20 \overline{)98}$ ^{4R18} | 10. $23 \overline{)98}$ ^{4R6} |
| 11. $2 \overline{)14}$ ⁷ | 12. $20 \overline{)140}$ ⁷ | 13. $18 \overline{)140}$ ^{7R14} | 14. $18 \overline{)137}$ ^{7R11} | 15. $22 \overline{)155}$ ^{7R1} |
| 16. $3 \overline{)21}$ ⁷ | 17. $30 \overline{)210}$ ⁷ | 18. $30 \overline{)220}$ ^{7R10} | 19. $31 \overline{)220}$ ^{7R3} | 20. $31 \overline{)229}$ ^{7R12} |
| 21. $4 \overline{)28}$ ⁷ | 22. $40 \overline{)280}$ ⁷ | 23. $40 \overline{)300}$ ^{7R20} | 24. $42 \overline{)300}$ ^{7R6} | 25. $43 \overline{)320}$ ^{7R19} |
| 26. $35 \overline{)335}$ ^{9R20} | 27. $27 \overline{)247}$ ^{9R4} | 28. $53 \overline{)366}$ ^{6R48} | 29. $71 \overline{)623}$ ^{8R55} | 30. $47 \overline{)286}$ ^{6R4} |

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Using the Exercises

- Questions 1 to 25 are designed to develop facility in estimating a quotient. In all divisions here the trial quotient works. See that the students place their quotients over the correct number in the dividend.
- Questions 26 to 30 include some divisions in which the first trial quotient does not work (questions 26, 27, and 28). Discuss these situations in detail and point out the importance of comparing the remainders.

First estimate.

35 rounds up to 40

$$\begin{array}{r} 8 \\ 35 \overline{)335} \\ \underline{-280} \end{array}$$

55 ← too much!

Second estimate.

Try 9.

$$\begin{array}{r} 9 \\ 35 \overline{)335} \\ \underline{-315} \end{array}$$

20 ← O.K. It's less than 35.

PRACTICE

Divide. Check your answer.

1. $21 \overline{)84}$ ⁴
2. $19 \overline{)57}$ ^{3 R 8}
3. $42 \overline{)93}$ ^{2 R 9}
4. $37 \overline{)81}$ ^{2 R 7}
5. $22 \overline{)136}$ ^{6 R 4}
6. $18 \overline{)163}$ ^{9 R 1}
7. $37 \overline{)162}$ ^{4 R 14}
8. $52 \overline{)421}$ ^{8 R 5}
9. $77 \overline{)641}$ ^{8 R 25}
10. $90 \overline{)462}$ ^{5 R 12}
11. $33 \overline{)234}$ ^{7 R 3}
12. $58 \overline{)542}$ ^{9 R 20}
13. $91 \overline{)497}$ ^{5 R 42}
14. $39 \overline{)281}$ ^{7 R 8}
15. $62 \overline{)189}$ ^{3 R 3}
16. $27 \overline{)241}$ ^{8 R 25}

Solve.

17. Some students plan to display their art work in the school corridor. Each picture is 92 cm wide. How many pictures can they put in a row on a wall space 840 cm wide? **9 R 12 cm**
18. Lori is practising a speech for 25 min each day. She plans to practise for a total of 150 min. How many days will she practise? **6 days**
19. A can of coffee costs \$4.86. It will make 81 cups. How many cents will each cup cost? **6¢**
20. Each jug of juice costs \$1.54. If 22 servings can be obtained from the jug, how many cents will each serving cost? **7¢**

Number Riddle

I am a three-digit number.
Every even number less than 10
is a divisor of me.
The first odd number greater
than 10 is a divisor of me.
Who am I?

264

264 ⁷⁵⁶
178 **421**
392 ⁵²⁴ ⁴⁶²
811
NINE HUNDRED SEVENTY-THREE

131

Assigning the Practice

Minimum: odd numbers

Average: even numbers

Enriched: 11-20

Reinforcement

1. Ask the students to solve these division pairs. The first trial quotient will work for one of the divisions in the pair, but not for the other.

a. $33 \overline{)272}$ $33 \overline{)256}$

b. $48 \overline{)151}$ $48 \overline{)143}$

2. Ask the students to *think of quarters* as they estimate the quotients for these divisions.

a. $25 \overline{)179}$ b. $25 \overline{)146}$

c. $25 \overline{)231}$ d. $25 \overline{)265}$

3. Have the students determine the missing factors.

a. $6 \times \square = 342$ b. $65 \times \square = 520$

c. $\square \times 84 = 252$ d. $\square \times 23 = 184$

e. $7 \times \square = 553$ f. $\square \times 9 = 405$

Enrichment

1. Assign *Number Riddle* at the bottom of page 131.

2. Let the students apply the checking procedure explained on page 125 to division problems.

Extra Practice

Divide. Check your answers.

1. $21 \overline{)148}$ ^{7 R 1}
2. $49 \overline{)259}$ ^{5 R 14}
3. $52 \overline{)367}$ ^{7 R 3}
4. $28 \overline{)245}$ ^{8 R 21}
5. $78 \overline{)417}$ ^{5 R 27}
6. $30 \overline{)281}$ ^{9 R 11}
7. $63 \overline{)325}$ ^{5 R 10}
8. $52 \overline{)381}$ ^{7 R 17}
9. $38 \overline{)284}$ ^{7 R 18}
10. $51 \overline{)411}$ ^{8 R 3}
11. $42 \overline{)346}$ ^{8 R 10}
12. $78 \overline{)586}$ ^{7 R 40}

Solve.

13. It takes Tony 22 min to mow the lawn. He figures that he will spend 176 min mowing the lawn in July. How many times does he plan to mow the lawn? **8 times**
14. Anita needs 249¢ for a book. She can save about 38¢ of her allowance each week. How long will it take her to save enough for the book? **7 weeks**

Worksheet A29

Pages 130-131

Objective A30

Divide a three-digit dividend by a two-digit divisor (one stage), with or without a remainder.

Introducing the Lesson

Provide some practice in estimating before teaching the lesson example. For example, ask: "How many 18s are there in 110?" The students make an estimate like 5. Then multiply: $5 \times 18 = 90$. Then ask, can anyone come closer without going over 110? Make this an oral game challenging the students to estimate as quickly as possible.

Teaching the Lesson

Read and discuss the problem at the top of page 132. Explain the required division at the chalkboard.

1. Estimate.

$\begin{array}{r} 5 \\ 18 \overline{)110} \end{array}$ 18 rounds up to 20.
There are 5 twenties in 110.

2. Multiply, subtract, and compare.

$$\begin{array}{r} 5 \\ 18 \overline{)110} \\ - 90 \\ \hline 20 \end{array}$$

The remainder, 20, is **not less than** the divisor. The quotient is *too small*.

At this point, a larger quotient, 6, is tried and the problem can be completed, since the remainder is less than the divisor.

Explain the following division at the chalkboard as an example of a trial quotient that is too large.

1. Estimate.

$\begin{array}{r} 8 \\ 54 \overline{)408} \end{array}$ 54 rounds down to 50.
There are 8 fifties in 408.

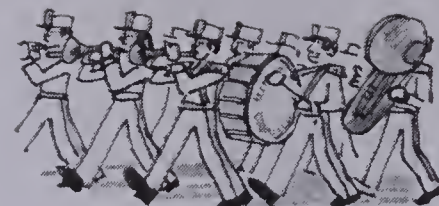
2. Multiply and subtract.

$\begin{array}{r} 8 \\ 54 \overline{)408} \\ - 432 \\ \hline \end{array}$ The subtraction cannot be done.
The quotient is *too large*.

Complete the problem with the smaller quotient, 7. Stress the importance of comparing the remainder with the divisor. Encourage the checking of answers, also.

Two-Digit Divisors

The 110 members of the Diefenbaker Drum and Bugle Corps and the Michener School Band marched together in a parade. They made up 18 rows. How many marchers were in each row?



Round the divisor.
Estimate.

$$\begin{array}{r} 5 \\ 18 \overline{)110} \end{array}$$

$$\begin{array}{r} 5 \\ 20 \overline{)110} \end{array}$$

$$\begin{array}{r} 5 \\ 18 \overline{)110} \\ - 90 \\ \hline 20 \end{array}$$

↑
larger than the divisor

The quotient 5 is too small.
Try 6.

$$\begin{array}{r} 6 \\ 18 \overline{)110} \\ - 108 \\ \hline 2 \end{array}$$

Write the remainder.

$$\begin{array}{r} 6R2 \\ 18 \overline{)110} \\ - 108 \\ \hline 2 \end{array}$$

Check:

$$\begin{array}{r} 18 \\ \times 6 \\ \hline 108 \\ + 2 \\ \hline 110 \end{array}$$

There were 6 marchers in each row, with 2 extra marchers.

EXERCISES

Tell what is wrong with the first division.

Complete the second division.

1. $\begin{array}{r} 3 \\ 23 \overline{)63} \\ - 69 \\ \hline \end{array}$ 3 too large

2. $\begin{array}{r} 6 \\ 27 \overline{)193} \\ - 162 \\ \hline 31 \end{array}$ 6 too small

3. $\begin{array}{r} 4 \\ 16 \overline{)82} \\ - 64 \\ \hline 18 \end{array}$ 4 too small

4. $\begin{array}{r} 9 \\ 62 \overline{)551} \\ - 558 \\ \hline \end{array}$ 9 too large

Divide: $\begin{array}{r} 3R12 \\ 24 \overline{)84} \end{array}$

7. $\begin{array}{r} 7R21 \\ 23 \overline{)182} \end{array}$

Using the Exercises

- For questions 1 to 4, discuss with the students what is wrong with the estimated quotient given and how the quotient should be adjusted. Then have them copy and complete each division.
- Stress the importance of comparing the remainders as the students do questions 5 to 8.

PRACTICE

Divide. Check your answer.

1. $42 \overline{)81}$ **1R39**
2. $27 \overline{)58}$ **2R4**
3. $18 \overline{)75}$ **4R3**
4. $23 \overline{)71}$ **3R2**
5. $54 \overline{)207}$ **3R45**
6. $66 \overline{)358}$ **5R28**
7. $17 \overline{)146}$ **8R10**
8. $94 \overline{)422}$ **4R46**
9. $83 \overline{)721}$ **8R57**
10. $36 \overline{)327}$ **9R3**
11. $19 \overline{)167}$ **8R15**
12. $43 \overline{)360}$ **8R16**

For each checking statement, write the corresponding division.

13. $7 \times 24 + 5 = 173$ **$173 \div 24 = 7R5$**
14. $5 \times 67 + 10 = 345$ **$345 \div 67 = 5R10$**
15. $8 \times 53 + 24 = 448$ **$448 \div 53 = 8R24$**
16. $9 \times 78 + 51 = 753$ **$753 \div 78 = 9R51$**

Solve.

17. The 245 members of the Jubilee Choir stood in rows when they performed. There were 35 singers in each row. How many rows were there? **7 rows**
18. The 28 members of the choir at Milton School went to hear the Jubilee Choir. The total cost of the tickets was \$140. How much was each ticket? **\$5.00**
19. Eighteen members of the band at Pearson School needed new belts for their uniforms. The cost was \$126. How much did each belt cost? **\$7.00**

Digit Decode

Each different symbol stands for a different digit. What are the missing digits?

$$\begin{array}{r} \bullet \\ 2 \bullet \overline{)1 \bullet \bullet} \\ - 1 \bullet \bullet \\ \hline 0 \end{array}$$

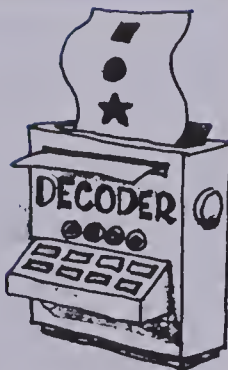
$\bullet = 6$

$$\begin{array}{r} \blacksquare \\ 1 \blacksquare \overline{)7 \blacksquare} \\ - 7 \blacksquare \\ \hline 0 \end{array}$$

$\blacksquare = 5$

$$\begin{array}{r} \star R1 \\ \star 2 \overline{)1 \bullet 9} \\ - 1 \bullet 8 \\ \hline 1 \end{array}$$

$\star = 4$



133

Assigning the Practice

Minimum: even numbers

Average: odd numbers

Enriched: odd numbers

Reinforcement

1. Play this division game for up to four players. Make one game board for each player.



Prepare four numeral cards for each of the ten digits (0-9) for each player. Players first set a target number by spinning a dial that is numbered from 2 to 9. Then the player draws a card and places it over a blank square on his or her game board. When all five blanks have been covered, the player computes the quotient. The player whose quotient is closest to the target number wins.

2. Have the students complete this chart.

dividend	divisor	quotient
147	\blacksquare	7
210	35	\blacksquare
\blacksquare	56	8
384	96	\blacksquare

Enrichment

1. Assign *Digit Decode* at the bottom of page 133.
2. Ask the students to write a word problem that uses these divisions.
 - a. $270 \div 6 = 45$
 - b. $52 \times 9 = 468$
 - c. $108 \div 12 = 9$

Extra Practice

Divide. Check your answers.

1. $52 \overline{)271}$ **5R11**
2. $37 \overline{)161}$ **4R13**
3. $37 \overline{)196}$ **5R11**
4. $17 \overline{)142}$ **8R6**
5. $18 \overline{)168}$ **9R6**
6. $43 \overline{)357}$ **8R13**
7. $53 \overline{)357}$ **6R39**
8. $17 \overline{)135}$ **7R16**
9. $44 \overline{)171}$ **3R39**
10. $25 \overline{)207}$ **8R7**
11. $57 \overline{)355}$ **6R13**
12. $64 \overline{)484}$ **7R36**

Solve.

13. A fruit stand owner bought some pears at \$34.00 a carton. He paid \$272.00 in all. How many cartons did he buy? **8**
14. A family drove to their cottage. They averaged 75 km/h. The trip is 310 km. About how many hours did it take? **About 4 h**

Worksheet A30

Pages 132-133

Objective A31

Divide a three- or four-digit dividend by a two-digit multiple of ten (two stages).

Introducing the Lesson

Review two-stage division in which there is a one-digit divisor with this chalkboard problem.

1. Estimate.

$$\begin{array}{r} 7 \\ 9 \overline{)647} \end{array}$$

The 7 is written in the tens place, since there are about 70 nines in 647, not 700 or 7.

2. Multiply, subtract, and compare.

$$\begin{array}{r} 7 \\ 9 \overline{)647} \\ - 63 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 71 \text{ R}8 \\ 9 \overline{)647} \\ - 63 \\ \hline 17 \\ 9 \\ \hline 8 \end{array}$$

The remainder is less than the divisor. Bring down the 7 ones and repeat the EMS cycle.

Teaching the Lesson

Work through the problem at the top of page 134 with the students.

1. Estimate.

$$\begin{array}{r} 4 \\ 60 \overline{)2880} \end{array}$$

The 4 is written in the tens place, because there are about 40 sixties in 2880, not 4000, 400, or 4.

2. Multiply, subtract, and compare.

$$\begin{array}{r} 4 \\ 60 \overline{)2880} \\ - 240 \\ \hline 48 \end{array}$$

The remainder, 48, is less than the divisor, 60.

Bring down the 0 ones and repeat the EMS cycle.

$$\begin{array}{r} 48 \\ 60 \overline{)2880} \\ - 240 \\ \hline 480 \\ - 480 \\ \hline 0 \end{array}$$

Dividing by Multiples of Ten

Rita interviewed an actor of a play she had seen. She learned that the actors had practised the play for 2880 min. How many hours is that?



Estimate.

$$60 \times 40 = 2400$$

Multiply

and subtract.

Remember the ones.

Estimate, multiply, and subtract.

$$\begin{array}{r} 4 \\ 60 \overline{)2880} \end{array}$$

$$\begin{array}{r} 4 \\ 60 \overline{)2880} \\ - 240 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 4 \\ 60 \overline{)2880} \\ - 240 \\ \hline 480 \end{array}$$

$$\begin{array}{r} 48 \\ 60 \overline{)2880} \\ - 240 \\ \hline 480 \\ - 480 \\ \hline 0 \end{array}$$

The actors practised the play for 48 h.

EXERCISES

Copy and complete the division.

- | | | | |
|---|--|---|---|
| 1. $10 \overline{)280}$
$- 20$
$\hline 80$
$- 80$
$\hline 0$ | 2. $30 \overline{)422}$
$- 30$
$\hline 122$
$- 120$
$\hline 2$ | 3. $50 \overline{)650}$
$- 50$
$\hline 150$
$- 150$
$\hline 0$ | 4. $20 \overline{)683}$
$- 60$
$\hline 83$
$- 80$
$\hline 3$ |
| 5. $70 \overline{)4485}$
$- 420$
$\hline 285$
$- 280$
$\hline 5$ | 6. $40 \overline{)3440}$
$- 320$
$\hline 240$
$- 240$
$\hline 0$ | 7. $90 \overline{)4776}$
$- 450$
$\hline 276$
$- 270$
$\hline 6$ | 8. $80 \overline{)4643}$
$- 400$
$\hline 643$
$- 640$
$\hline 3$ |
| 9. $10 \overline{)570}$
$- 50$
$\hline 20$
$- 20$
$\hline 0$ | 10. $20 \overline{)267}$
$- 20$
$\hline 67$
$- 60$
$\hline 7$ | 11. $40 \overline{)963}$
$- 80$
$\hline 163$
$- 160$
$\hline 3$ | 12. $30 \overline{)695}$
$- 60$
$\hline 95$
$- 90$
$\hline 5$ |
| 13. $60 \overline{)3124}$
$- 300$
$\hline 124$
$- 120$
$\hline 4$ | 14. $40 \overline{)3240}$
$- 320$
$\hline 40$
$- 40$
$\hline 0$ | 15. $70 \overline{)6517}$
$- 560$
$\hline 917$
$- 910$
$\hline 7$ | 16. $80 \overline{)6969}$
$- 640$
$\hline 569$
$- 560$
$\hline 9$ |

Using the Exercises

- Questions 1 to 8 have been started and need only to be completed. Since not all of the computations involved in long division have to be done, the student can concentrate on procedure and format.
- Questions 9 to 16 require all the work to be done by the students. Provide graph paper for students having trouble with numeral alignment. Encourage the checking of answers through multiplication.

PRACTICE

Divide. Check your answer.

1. $20 \overline{)640}$ 32
2. $30 \overline{)577}$ $19R7$
3. $40 \overline{)920}$ 23
4. $50 \overline{)705}$ $14R5$
5. $40 \overline{)3282}$ $82R2$
6. $60 \overline{)3783}$ $63R3$
7. $90 \overline{)2435}$ $27R5$
8. $80 \overline{)3920}$ 49
9. $50 \overline{)2971}$ $59R21$
10. $30 \overline{)2554}$ $85R4$
11. $70 \overline{)3920}$ 56
12. $60 \overline{)5048}$ $84R8$
13. $40 \overline{)2541}$ $63R21$
14. $80 \overline{)5732}$ $71R52$
15. $50 \overline{)4189}$ $83R39$
16. $90 \overline{)7426}$ $82R46$

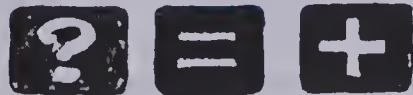
Solve.

17. The backdrop for the Loose Ties musical group uses 40 W (watt) bulbs. The total number of watts from the backdrop is 1640. How many bulbs are in it? 41
18. On Friday the box office sold 90 tickets for a coming rock concert. It took in \$1260 for these tickets. How much did each ticket cost? $\$14.00$
19. 748 young people came to the concert on special buses. There were about 40 young people on each bus. How many buses were there? 19

USING THE CALCULATOR

Use a calculator to do several problems. Look for a pattern. Then do as many problems as you can without using the calculator. Use it to check your answers.

- $$\begin{array}{lll} 3000 \div 10 & 300 & 3000 \div 100 & 30 & 3000 \div 1000 & 3 \\ 52\,000 \div 10 & 5200 & 52\,000 \div 100 & 520 & 52\,000 \div 1000 & 52 \\ 618\,000 \div 10 & 61\,800 & 618\,000 \div 100 & 6180 & 618\,000 \div 1000 & 618 \\ 9000 \div 10 & 900 & 9000 \div 100 & 90 & 9000 \div 1000 & 9 \\ 327\,000 \div 10 & 32\,700 & 327\,000 \div 100 & 3270 & 327\,000 \div 1000 & 327 \end{array}$$



135

Assigning the Practice

Minimum: even numbers

Average: odd numbers

Enriched: 10-19

Reinforcement

1. Have the students find the following quotients.

- a. $7 \overline{)28}$ $7 \overline{)280}$ $70 \overline{)280}$ $70 \overline{)2800}$
- b. $5 \overline{)350}$ $50 \overline{)350}$ $5 \overline{)35}$ $50 \overline{)3500}$
- c. $80 \overline{)640}$ $8 \overline{)64}$ $80 \overline{)6400}$ $8 \overline{)640}$
- d. $4 \overline{)320}$ $40 \overline{)3200}$ $40 \overline{)320}$ $4 \overline{)32}$
- e. $90 \overline{)810}$ $9 \overline{)81}$ $90 \overline{)8100}$ $9 \overline{)810}$
- f. $6 \overline{)42}$ $6 \overline{)420}$ $60 \overline{)420}$ $60 \overline{)4200}$

2. Ask the students to complete the following chart.

length	width	area
36 cm	50 cm	■
40 m	■	2720 m ²
■	80 cm	3520 cm ²
20 m	75 m	■
70 m	■	3920 m ²
■	60 cm	5880 cm ²

Enrichment

1. Assign *Using the Calculator* at the bottom of page 135. Once students have completed the problems, ask them to do these.

- a. $6000 \div 20$
- b. $6000 \div 200$
- c. $6000 \div 2000$
- d. $9000 \div 30$
- e. $9000 \div 300$
- f. $9000 \div 3000$

2. Have the students look at each pair of numbers and explain what was done to the number at the left to become the number at the right.

- a. $7000 \rightarrow 70\,000$
- b. $900 \rightarrow 9$
- c. $40 \rightarrow 4000$
- d. $6000 \rightarrow 6$
- e. $80\,000 \rightarrow 800$

Extra Practice

Divide. Check your answers.

1. $40 \overline{)760}$ 19
2. $20 \overline{)900}$ 45
3. $30 \overline{)610}$ $20R10$
4. $70 \overline{)282}$ $4R2$
5. $50 \overline{)3300}$ 66
6. $60 \overline{)4320}$ 72
7. $80 \overline{)4640}$ 58
8. $90 \overline{)4751}$ $52R71$
9. $40 \overline{)1482}$ $37R2$
10. $50 \overline{)2645}$ $52R45$
11. $30 \overline{)785}$ $26R5$
12. $60 \overline{)5270}$ $87R50$

Solve.

13. The Eagles Club is having a dinner-dance. The tickets are \$20.00 a couple. How many couples will have to buy tickets to raise \$1500.00? 75
14. How many minutes are equal to 4500 s (seconds)? 75 min

Worksheet A31

Pages 134–135

Objective A32

Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.

Introducing the Lesson

Write the following divisions on the chalkboard. Ask the students to suggest situations in which these divisions would be necessary.

a. $1375 \div 25 = 55$
 b. $5576 \div 68 = 82$

Teaching the Lesson

Read and discuss the problem at the top of page 136. Explain the long division steps as the problem is worked at the chalkboard.

Use the following problem as an example of the trial quotient not working in the second stage:

1. First EMS cycle completed.

$$\begin{array}{r} 8 \\ 28 \overline{)2418} \\ \underline{-224} \\ 178 \end{array}$$

2. Estimate.

$$\begin{array}{r} 85 \\ 28 \overline{)2418} \\ \underline{-224} \\ 178 \end{array}$$

28 rounds up to 30.
 $178 \div 30 \approx 5$
 Try 5.

3. Multiply, subtract, compare.

$$\begin{array}{r} 85 \\ 28 \overline{)2418} \\ \underline{-224} \\ 178 \\ \underline{140} \\ 38 \end{array}$$

The remainder is larger than the divisor.
 Try 6.

Complete the problems and try others similar to it. Continue to stress the importance of comparing the remainder to the divisor.

Two-Digit Divisors

Tony counted 12 cars on the mini-train at the zoo. The guide said the train carries 372 people. How many people does each car seat?



$$372 \div 12 = ?$$

Round the divisor.
 Estimate.

$$\begin{array}{r} 3 \\ 10 \overline{)372} \end{array}$$

Multiply and subtract.

$$\begin{array}{r} 3 \\ 12 \overline{)372} \\ \underline{-36} \\ 1 \end{array}$$

Remember the ones.

$$\begin{array}{r} 3 \\ 12 \overline{)372} \\ \underline{-36} \\ 12 \end{array}$$

Estimate, multiply, and subtract.

$$\begin{array}{r} 31 \\ 12 \overline{)372} \\ \underline{-36} \\ 12 \\ \underline{-12} \\ 0 \end{array}$$

Each car seats 31 people.

EXERCISES

- Divide.
- | | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| 1. $20 \overline{)400}$ | 2. $21 \overline{)441}$ | 3. $20 \overline{)250}$ | 4. $19 \overline{)247}$ |
| 5. $30 \overline{)830}$ | 6. $32 \overline{)832}$ | 7. $50 \overline{)580}$ | 8. $45 \overline{)585}$ |
| 9. $50 \overline{)1600}$ | 10. $51 \overline{)1632}$ | 11. $40 \overline{)2500}$ | 12. $38 \overline{)2470}$ |
| 13. $60 \overline{)4200}$ | 14. $57 \overline{)4218}$ | 15. $60 \overline{)2600}$ | 16. $62 \overline{)2604}$ |
| 17. $29 \overline{)2440}$ | 18. $38 \overline{)2058}$ | 19. $49 \overline{)2568}$ | 20. $42 \overline{)2656}$ |

Using the Exercises

- Questions 1 to 16 are paired to help the students round the quotient. For most divisions, the first trial quotient works. In questions 8, 12, and 14, the trial quotient of the second stage does not work at first.
- Questions 17 to 20 give no help for rounding the quotient. See that students place their quotients properly over the dividend. Provide graph paper for those who have difficulty in this respect.

PRACTICE

Find the quotient.

1. $80 \overline{)7315}$ $91R35$
2. $90 \overline{)4621}$ $51R31$
3. $62 \overline{)1894}$ $30R34$
4. $21 \overline{)1360}$ $64R16$
5. $71 \overline{)5023}$ $70R53$
6. $33 \overline{)2345}$ $71R2$
7. $27 \overline{)2419}$ $89R16$
8. $19 \overline{)1638}$ $86R4$
9. $37 \overline{)1624}$ $43R33$
10. $58 \overline{)5421}$ $93R27$
11. $41 \overline{)2152}$ $52R20$
12. $82 \overline{)4125}$ $50R25$
13. $59 \overline{)3140}$ $53R13$
14. $91 \overline{)4976}$ $54R62$
15. $77 \overline{)6413}$ $83R22$
16. $39 \overline{)2819}$ $72R11$

For each checking statement, write a corresponding division.

17. $91 \times 32 + 13 = 2925$ $2925 \div 91 = 32R13$
18. $59 \times 41 + 7 = 2426$ $2426 \div 59 = 41R7$
19. $19 \times 53 + 8 = 1015$ $1015 \div 19 = 53R8$
20. $22 \times 78 + 26 = 1742$ $1742 \div 22 = 78R26$

Solve.

21. The zoo ordered 373 kg of bird seed. This amount lasts 21 days. About how much bird seed do they use each day? 18 kg
22. The zoo was open 31 days last month for a total of 341 h. How many hours was it open each day? 11 h

Short Cuts

To multiply by 25:

Multiply by 100. Divide by 4.

$$25 \times 64 = 6400 \div 4 = 1600$$

To multiply by 50:

Multiply by 100. Divide by 2.

$$50 \times 22 = 2200 \div 2 = 1100$$

Try these:

- a. 25×32 800
- b. 25×120 3000
- c. 25×16 400
- d. 50×48 2400
- e. 50×56 2800
- f. 50×114 5700
- g. Explain why these short cuts work.

$$100 \div 4 = 25 \quad 100 \div 2 = 50$$



137

Assigning the Practice

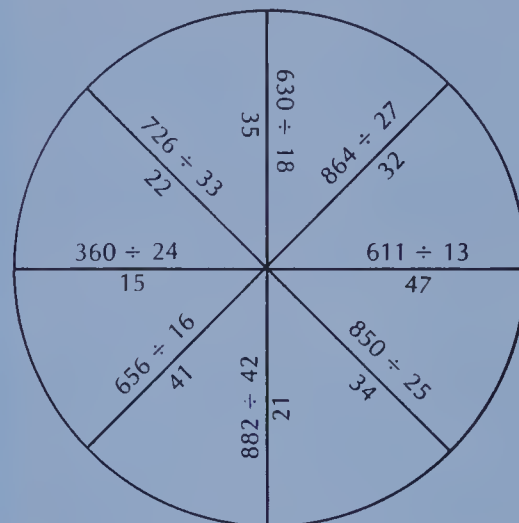
Minimum: odd numbers

Average: even numbers

Enriched: 12-22

Reinforcement

1. Ask the students to cut out this puzzle, mix the pieces, and then glue it together again on stiff paper.



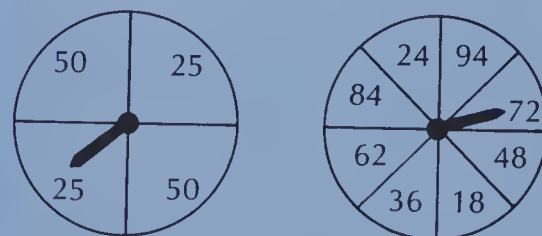
2. Have the students do these divisions which give practice with zeros in the quotient.

- a. $653 \div 32$
- b. $371 \div 12$
- c. $4489 \div 56$
- d. $1155 \div 19$
- e. $1099 \div 27$
- f. $1391 \div 46$

Enrichment

1. Assign *Short Cuts* at the bottom of page 137. See if the students can discover that this rule only works with even numbers.

2. Have the students make up a spinner game using the short cut rules on page 137. Make two spinners for the game.



3. Ask the students to explain why 6400, 2200, 1200, 900, etc. are evenly divisible by 2, 4, 25, and 50.

Extra Practice

Divide. Check your answers.

1. $28 \overline{)784}$ 28
2. $37 \overline{)741}$ $20R1$
3. $42 \overline{)657}$ $15R27$
4. $53 \overline{)1789}$ $33R40$
5. $68 \overline{)5264}$ $77R28$
6. $77 \overline{)6655}$ $86R33$
7. $34 \overline{)782}$ 23
8. $57 \overline{)4536}$ $79R33$
9. $83 \overline{)7162}$ $86R24$
10. $49 \overline{)2389}$ $48R37$
11. $31 \overline{)1892}$ $61R1$
12. $18 \overline{)453}$ $25R3$

Solve.

13. The animal feed machine at the zoo takes only quarters. The machine has 975¢ in it. How many quarters are in it? 39
14. There were 12 adults on an elevator. Their total mass was 820 kg. What was the average mass of each adult? $68 \text{ R } 4 \text{ kg}$

Worksheet A32

Pages 136 - 137

Objective A33

Divide a three- or four-digit dividend by a two-digit divisor (two stages), with or without a remainder.

Introducing the Lesson

Show newspaper clippings or ads similar to the following. Have the students devise word problems requiring division based on the information presented.

1330 people attended the recent film festival which lasted for 14 days.

Rent a sailboat. \$2500 for two weeks.

Teaching the Lesson

Read and discuss the problem situation at the top of page 138. Explain each long division step.

1. Estimate.

$$\begin{array}{r} 3 \\ 94 \overline{) 2726} \end{array}$$

The 3 is written in the tens place since there are about 30 ninety-fours in 2726, not 3000, 300, or 3.

2. Multiply and subtract.

$$\begin{array}{r} 3 \\ 94 \overline{) 2726} \\ - 282 \end{array}$$

← This is too large. Repeat the EMS cycle with 2 in the quotient.

3. Estimate, multiply, subtract, compare.

$$\begin{array}{r} 2 \\ 94 \overline{) 2726} \\ - 188 \\ \hline 84 \end{array}$$

The remainder is less than the divisor.

Bring down the 6 ones and repeat the EMS cycle.

$$\begin{array}{r} 29 \\ 94 \overline{) 2726} \\ - 188 \\ \hline 846 \\ - 846 \\ \hline 0 \end{array}$$

Check:

$$\begin{array}{r} 29 \\ \times 94 \\ \hline 116 \\ 2610 \\ \hline 2726 \end{array}$$

Two-Digit Divisors

About 94 children attended each showing of the movie, *Hello Mars!* A total of 2726 children saw it. How many showings of the movie were there?



Round the divisor.
Estimate.

$$\begin{array}{r} 3 \\ 90 \overline{) 2726} \end{array}$$

$$\begin{array}{r} 3 \\ 94 \overline{) 2726} \\ - 282 \\ \hline \end{array}$$

too large;
can't subtract

Try 2.

$$\begin{array}{r} 2 \\ 94 \overline{) 2726} \\ - 188 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 29 \\ 94 \overline{) 2726} \\ - 188 \\ \hline 846 \\ - 846 \\ \hline 0 \end{array}$$

There were 29 showings of the movie.

EXERCISES

Tell what is wrong with the first division. Complete the second division.

$$\begin{array}{r} 8 \\ 37 \overline{) 3367} \\ - 296 \\ \hline 40 \end{array}$$

8 too small

$$\begin{array}{r} 9 \text{ R } 1 \\ 37 \overline{) 3367} \\ - 333 \\ \hline 37 \\ - 37 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 5 \\ 53 \overline{) 2505} \\ - 265 \\ \hline \end{array}$$

5 too large

$$\begin{array}{r} 7 \text{ R } 14 \\ 53 \overline{) 2505} \\ - 369 \\ \hline 212 \\ - 159 \\ \hline 535 \\ - 535 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 6 \\ 74 \overline{) 4292} \\ - 444 \\ \hline \end{array}$$

6 too large

$$\begin{array}{r} 58 \\ 74 \overline{) 4292} \\ - 370 \\ \hline 592 \\ - 592 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 5 \\ 46 \overline{) 2852} \\ - 230 \\ \hline \end{array}$$

5 too small

$$\begin{array}{r} 62 \\ 46 \overline{) 2852} \\ - 276 \\ \hline 92 \\ - 92 \\ \hline 0 \end{array}$$

Divide.

$$\begin{array}{r} 13 \text{ R } 32 \\ 42 \overline{) 578} \\ - 36 \\ \hline 218 \end{array}$$

$$\begin{array}{r} 37 \text{ R } 13 \\ 23 \overline{) 864} \\ - 69 \\ \hline 174 \end{array}$$

$$\begin{array}{r} 40 \text{ R } 9 \\ 17 \overline{) 689} \\ - 68 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 5 \text{ R } 1 \\ 28 \overline{) 141} \\ - 14 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 36 \text{ R } 28 \\ 33 \overline{) 1216} \\ - 99 \\ \hline 226 \end{array}$$

$$\begin{array}{r} 40 \text{ R } 10 \\ 56 \overline{) 2250} \\ - 112 \\ \hline 1130 \end{array}$$

$$\begin{array}{r} 68 \text{ R } 36 \\ 62 \overline{) 4252} \\ - 372 \\ \hline 532 \end{array}$$

$$\begin{array}{r} 80 \text{ R } 13 \\ 74 \overline{) 5933} \\ - 592 \\ \hline 13 \end{array}$$

Using the Exercises

- In questions 1 to 4, discuss with the students what is wrong with the quotient estimate given, and how the quotient should be adjusted. Then ask them to complete each division.
- Stress the importance of comparing remainders as the students do questions 5 to 12.

PRACTICE

Find the quotient.

- $15 \overline{)260}$ $17R5$
- $18 \overline{)738}$ 41
- $37 \overline{)1890}$ $51R3$
- $23 \overline{)705}$ $30R15$
- $56 \overline{)2010}$ $35R50$
- $86 \overline{)3752}$ $43R54$
- $19 \overline{)1066}$ $56R2$
- $42 \overline{)2175}$ $51R33$
- $37 \overline{)1381}$ $37R12$
- $82 \overline{)7184}$ $87R50$
- $97 \overline{)4783}$ $49R30$
- $78 \overline{)4448}$ $57R2$

For each checking statement, write a corresponding division.

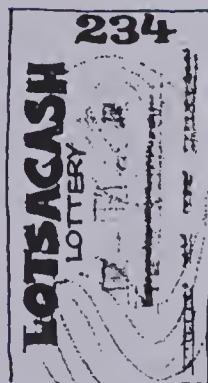
- $45 \times 29 + 3 = 1308$
 - $28 \times 22 + 6 = 622$
 - $37 \times 41 + 5 = 1522$
 - $62 \times 71 + 1 = 4403$
- Solve.
- $1308 \div 45 = 29R3$ $622 \div 28 = 22R6$
 $1522 \div 37 = 41R5$ $4403 \div 62 = 71R1$

- The theatre needs 912 *Mini-Martian* candy bars to sell. They come in boxes of 24. How many boxes should they order? **38**
- Five boys and seven girls distributed handbills about the movie. Altogether they gave out 1044 handbills. If they each distributed the same number, how many did each one give out? **87**

Winning Ticket

The printer did not put the 0 in the number on the winning ticket. Can you put it in correctly? The winning number is the product of a two-digit number (between 30 and 60) multiplied by itself.

$$2304 (48 \times 48)$$



139

Assigning the Practice

Minimum: 1-17

Average: 1-18

Enriched: 1-18

Reinforcement

1. Ask the students to find the lengths of the following rectangles whose widths and areas are given.

a. $A = 1625 \text{ cm}^2$ 25 cm

b. $A = 2352 \text{ m}^2$ 42 m

c. $A = 1104 \text{ cm}^2$ 12 cm

d. $A = 2544 \text{ m}^2$ 53 m

2. Have the students complete the following charts.

Rule: $\div 18$	
in	out
414	
1206	
1512	

Rule: $\div 24$	
in	out
576	
408	
1152	

Rule: ?	
in	out
121	11
165	15
209	19

Rule: ?	
in	out
135	9
225	15
375	25

Extra Practice

Divide. Check your answer.

- $53 \overline{)1961}$ **37**
- $46 \overline{)3651}$ **79R17**
- $56 \overline{)1075}$ **19R11**
- $32 \overline{)2384}$ **74R16**
- $54 \overline{)2251}$ **41R37**
- $57 \overline{)4452}$ **78R6**
- $49 \overline{)4760}$ **97R2**
- $71 \overline{)5230}$ **73R47**
- $28 \overline{)1492}$ **53R8**
- $84 \overline{)6191}$ **73R59**
- $55 \overline{)2841}$ **51R36**
- $63 \overline{)4662}$ **74**

Solve.

- The money taken in for the \$18.00 seats at the ballet was \$1368. How many \$18 tickets were sold? **76**
- The Junior Reporters Club puts out its own newspaper. The Club makes a profit of 11¢ on each newspaper sold. Last month the profit was 407¢. How many newspapers were sold? **37**

Worksheet A33

Pages 138 - 139

Enrichment

1. Assign *Winning Ticket* at the bottom of page 139.

2. Prepare a collection of newspaper ads and clippings from which the students can write word problems. Make a worksheet of these problems for the class to solve.

Objective PS5

Solve problems that have extraneous information.

Introducing the Lesson

Ask a few students to tell the class:

- how they celebrated their last birthday.
- what they did on their last holiday.
- how to make a hamburger.

When they have finished, ask if any extra information was given in their stories. Point out that often we are distracted from the main point of a story by unessential (although interesting) details.

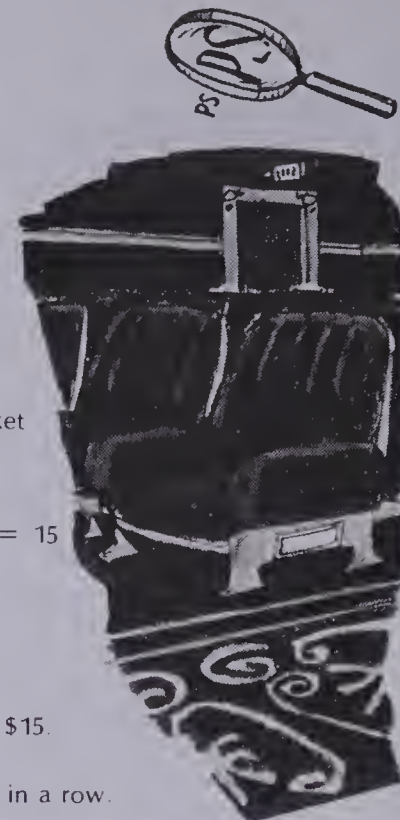
Teaching the Lesson

Work through the lesson example at the top of page 140 together. Review the four **IDEA** steps as you apply them to the problem. For the *Identify* step, stress that not all the information given is necessary. In the *Decide* step, a decision is made as to which facts are needed and which operation should be used to solve the problem.

Extra Information

Section A at Music Hall has 60 seats in rows of 12. When they are sold out, the ticket money for these seats totals \$900. How much does a ticket for a seat in Section A cost?

<div style="border: 1px solid black; padding: 5px; text-align: center;">Identify</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Decide</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Evaluate</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">Answer</div>	<p>60 seats 12 seats in a row \$900 total ticket sales</p> <p>To find how much one ticket costs, divide.</p> $\begin{array}{r} 15 \\ 60 \overline{) 900} \\ \underline{-60} \\ 300 \\ \underline{-300} \\ 0 \end{array}$ <p>Each of these tickets costs \$15.</p>
---	--



You didn't need to know the number of seats in a row.

EXERCISES

What information is not needed?

- Grade 5 made 180 Christmas cards. It took them 3 days. They sold the cards for 15¢ each. How much money did they take in? **\$27.00**
- Mercy practised 3 pieces on her clarinet. She practised for a total of 780 min. How many hours was that? **13 h**
- Lou rented a pair of skates at 1:00 o'clock and used them 4 h. The charge was 75¢ an hour. How much did Lou have to pay? **\$3.00**

Using the Exercises

- Read aloud and discuss questions 1 to 3. Have the students pick out the unnecessary information and then solve each problem.

PRACTICE

Solve each problem.

- Mrs. Byrne has 60 jelly jars. Each of them holds 224 mL. She filled 24 with apple jelly. How much apple jelly does she have? **5376 mL**
- The Lazy Rooster game costs the storekeeper \$6.00. She sells it for \$9.00. How much money does she pay for 27 games? **\$162.00**
- There are 30 students in Grade 5. They want to order 180 chocolate chip cookies. The cookies come in packages of 24. How many packages should they order? **8**
- Treesbank School has 350 children. The 250 children in Grades 1 to 4 are going to the zoo. Each bus can take 42 children. How many buses do they need? **6**
- An 18-year-old usher at the theatre earns \$155 a week. How much does he earn in 52 weeks? **\$8060.00**

REVIEW

Divide.

- A29 1. $60 \overline{)428}$ **7R8** 2. $38 \overline{)242}$ **6R14** 3. $47 \overline{)203}$ **4R15** 4. $91 \overline{)275}$ **3R2**
- A30 5. $52 \overline{)271}$ **5R11** 6. $36 \overline{)327}$ **9R3** 7. $43 \overline{)325}$ **7R24** 8. $19 \overline{)167}$ **8R15**
- A31 9. $60 \overline{)4500}$ **75** 10. $40 \overline{)760}$ **19** 11. $80 \overline{)3920}$ **49** 12. $70 \overline{)3920}$ **56**
- A32 13. $19 \overline{)247}$ **13** 14. $32 \overline{)832}$ **26** 15. $53 \overline{)1789}$ **33R40** 16. $27 \overline{)2419}$ **89R16**
- A33 17. $44 \overline{)578}$ **13R6** 18. $16 \overline{)384}$ **24** 19. $56 \overline{)2250}$ **40R10** 20. $74 \overline{)5317}$ **71R63**

141

Assigning the Practice

Minimum: 1-5

Average: 1-5

Enriched: 1-5

Review Exercises

Questions	Objective	Pages
1-4	A29	130-131
5-8	A30	132-133
9-12	A31	134-135
13-16	A32	136-137
17-20	A33	138-139

Reinforcement

Ask the students to form small groups of three or four. Have them write the following facts about themselves and their names on separate slips of paper.

- height in centimetres
- number of people in family
- birthday

Have these slips of paper placed in boxes on each group's table. Ask the students to sort the information as they answer questions such as:

- Who is the tallest? By how much?
- How many metres is everyone's combined heights?
- How many people in all families together?
- What is the average number of people in a family?
- Which birthday is closest to December 25th?
- Which two birthdays are closest to each other? By how many days are they apart?

Enrichment

Have the students devise a "Treasure Hunt" in the classroom. Clues are given such as:

- Divide: $64 \div 32$. This is how many metres west of the door a box with your next clue is.
 - Multiply: 6×8 . This is the page of the classroom dictionary to turn to. Here you will find your next clue.
- Provide a "treasure" for those who successfully complete the hunt.

Problem Solving Activities

Assign Level 5, Unit 6.

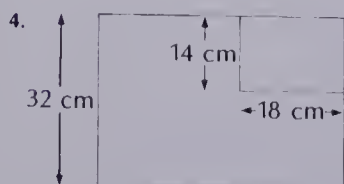
Extra Practice

Worksheet PS5

Pages 140-141

What information is not needed? Solve the problem.

- Six people are driving to the Yukon for a 10 day holiday. They will share the \$960 expenses. How much will each one pay? **\$160.00**
- The zoo's budget for hay is \$42 a day. An elephant can eat 50 kg of hay in a day. What is the zoo's annual budget for hay? **\$15 330**
- A refreshment booth plans to sell 648 cups of coffee at 35¢ each. The coffee urn makes 36 cups of coffee at a time. How many urns of coffee will be made? **18**



The area of the large rectangle is 1472 cm^2 . What is its length, if its width is 32 cm?

46 cm

Unit 6 Objective	Test Questions	Pages
A26	1-4	122-123
A27	5-8	124-125
A28	9-12	126-127
M13	13-16	128-129
A29	17-20	130-131
A30	21-24	132-133
A31	25-28	134-135
A32	29-32	136-137
A33	33-36	138-139
PS	37	140-141

TEST

UNIT 6

Multiply.

$$\begin{array}{r} 1. \quad 430 \\ \times 25 \\ \hline 10 \ 750 \end{array}$$

$$\begin{array}{r} 2. \quad 360 \\ \times 50 \\ \hline 18 \ 000 \end{array}$$

$$\begin{array}{r} 3. \quad 930 \\ \times 68 \\ \hline 63 \ 240 \end{array}$$

$$\begin{array}{r} 4. \quad 660 \\ \times 34 \\ \hline 22 \ 440 \end{array}$$

Estimate the product.

$$\begin{array}{r} 5. \quad 311 \\ \times 52 \\ \hline 15 \ 000 \end{array}$$

$$\begin{array}{r} 6. \quad 407 \\ \times 41 \\ \hline 16 \ 000 \end{array}$$

$$\begin{array}{r} 7. \quad 588 \\ \times 43 \\ \hline 24 \ 000 \end{array}$$

$$\begin{array}{r} 8. \quad 492 \\ \times 59 \\ \hline 30 \ 000 \end{array}$$

Multiply.

$$\begin{array}{r} 9. \quad 267 \\ \times 45 \\ \hline 12 \ 015 \end{array}$$

$$\begin{array}{r} 10. \quad 916 \\ \times 26 \\ \hline 23 \ 816 \end{array}$$

$$\begin{array}{r} 11. \quad 181 \\ \times 53 \\ \hline 9593 \end{array}$$

$$\begin{array}{r} 12. \quad 705 \\ \times 82 \\ \hline 5780 \end{array}$$

$$\begin{array}{r} 13. \quad \$4.82 \\ \times 26 \\ \hline \$125.32 \end{array}$$

$$\begin{array}{r} 14. \quad \$5.07 \\ \times 40 \\ \hline \$202.80 \end{array}$$

$$\begin{array}{r} 15. \quad \$8.24 \\ \times 61 \\ \hline \$502.64 \end{array}$$

$$\begin{array}{r} 16. \quad \$7.51 \\ \times 19 \\ \hline \$142.69 \end{array}$$

Divide. $9R11$

$$\begin{array}{r} 17. \quad 19 \overline{)182} \\ \underline{7R9} \end{array}$$

$$\begin{array}{r} 18. \quad 62 \overline{)248} \\ \underline{7R44} \end{array}$$

$$\begin{array}{r} 19. \quad 23 \overline{)174} \\ \underline{5R8} \end{array}$$

$$\begin{array}{r} 20. \quad 77 \overline{)641} \\ \underline{4R46} \end{array}$$

$$\begin{array}{r} 21. \quad 36 \overline{)261} \\ \underline{13} \end{array}$$

$$\begin{array}{r} 22. \quad 52 \overline{)408} \\ \underline{84} \end{array}$$

$$\begin{array}{r} 23. \quad 27 \overline{)143} \\ \underline{56} \end{array}$$

$$\begin{array}{r} 24. \quad 94 \overline{)422} \\ \underline{58} \end{array}$$

$$\begin{array}{r} 25. \quad 20 \overline{)260} \\ \underline{87R4} \end{array}$$

$$\begin{array}{r} 26. \quad 60 \overline{)5040} \\ \underline{55R21} \end{array}$$

$$\begin{array}{r} 27. \quad 70 \overline{)3920} \\ \underline{31R26} \end{array}$$

$$\begin{array}{r} 28. \quad 50 \overline{)2900} \\ \underline{12R35} \end{array}$$

$$\begin{array}{r} 29. \quad 28 \overline{)2440} \\ \underline{41R47} \end{array}$$

$$\begin{array}{r} 30. \quad 37 \overline{)2056} \\ \underline{79R2} \end{array}$$

$$\begin{array}{r} 31. \quad 52 \overline{)1638} \\ \underline{43R11} \end{array}$$

$$\begin{array}{r} 32. \quad 45 \overline{)575} \\ \underline{55R8} \end{array}$$

$$\begin{array}{r} 33. \quad 56 \overline{)2343} \end{array}$$

$$\begin{array}{r} 34. \quad 74 \overline{)5848} \end{array}$$

$$\begin{array}{r} 35. \quad 87 \overline{)3752} \end{array}$$

$$\begin{array}{r} 36. \quad 19 \overline{)1053} \end{array}$$

Solve.

37. The theatre needs about 72 small tubs and 39 large tubs for popcorn at each movie showing. How many small tubs should they order for 21 showings? 1512

Post-test

Unit 6

Multiply.

$$\begin{array}{r} 1. \quad 350 \\ \times 32 \\ \hline 11 \ 200 \end{array}$$

$$\begin{array}{r} 2. \quad 740 \\ \times 67 \\ \hline 49 \ 580 \end{array}$$

$$\begin{array}{r} 3. \quad 960 \\ \times 58 \\ \hline 55 \ 680 \end{array}$$

$$\begin{array}{r} 4. \quad 890 \\ \times 69 \\ \hline 61 \ 410 \end{array}$$

Estimate the product.

$$\begin{array}{r} 5. \quad 485 \\ \times 24 \\ \hline 10 \ 000 \end{array}$$

$$\begin{array}{r} 6. \quad 679 \\ \times 73 \\ \hline 49 \ 000 \end{array}$$

$$\begin{array}{r} 7. \quad 804 \\ \times 31 \\ \hline 24 \ 000 \end{array}$$

$$\begin{array}{r} 8. \quad 534 \\ \times 25 \\ \hline 15 \ 000 \end{array}$$

Multiply.

$$\begin{array}{r} 9. \quad 758 \\ \times 39 \\ \hline 29 \ 562 \end{array}$$

$$\begin{array}{r} 10. \quad 625 \\ \times 87 \\ \hline 54 \ 375 \end{array}$$

$$\begin{array}{r} 11. \quad 306 \\ \times 54 \\ \hline 16 \ 524 \end{array}$$

$$\begin{array}{r} 12. \quad 948 \\ \times 79 \\ \hline 74 \ 892 \end{array}$$

$$\begin{array}{r} 13. \quad \$2.65 \\ \times 86 \\ \hline \$227.90 \end{array}$$

$$\begin{array}{r} 14. \quad \$8.39 \\ \times 78 \\ \hline \$654.42 \end{array}$$

$$\begin{array}{r} 15. \quad \$9.98 \\ \times 59 \\ \hline \$588.82 \end{array}$$

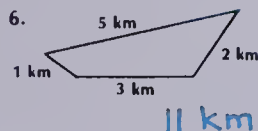
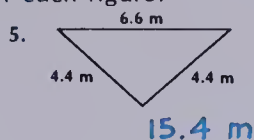
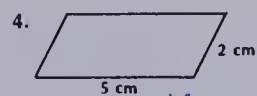
$$\begin{array}{r} 16. \quad \$7.85 \\ \times 93 \\ \hline \$730.05 \end{array}$$

MEASUREMENT

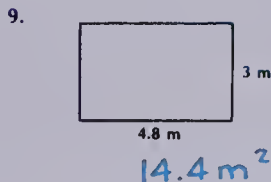
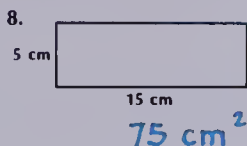
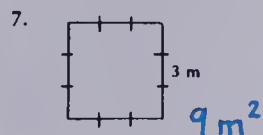
Would you use millimetres, centimetres, metres, or kilometres to measure these lengths?

1. a pair of scissors **cm** 2. a fence **m** 3. a stamp **mm**

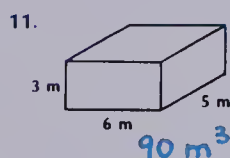
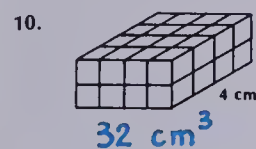
What is the perimeter of each figure?



What is the area?



What is the volume?



12. A box with:
Length = 15 cm
Width = 8 cm
Height = 11 cm
1320 cm³

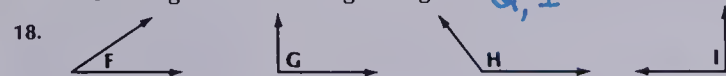
Which is more likely?

13. a thimble: 60 mL or **6 mL** 14. a birdbath: **2 L** or 2 mL

Copy and complete.

15. 3000 kg = **3** t 16. 9 kg = **9000** g 17. **2** t = 1500 kg + 500 kg

Name the angles that are right angles.



19. Measure the angle.

15°

Solve.

20. If 1 kg of apples costs \$1.05, what do 6 kg cost? **\$6.30**

Divide.

17. $19 \overline{)126}$ **6 R 12**

18. $22 \overline{)750}$ **34 R 2**

19. $63 \overline{)342}$ **5 R 27**

20. $58 \overline{)491}$ **8 R 27**

21. $88 \overline{)264}$ **3**

22. $72 \overline{)627}$ **8 R 51**

23. $93 \overline{)645}$ **6 R 87**

24. $47 \overline{)423}$ **9**

25. $40 \overline{)210}$ **5 R 10**

26. $80 \overline{)7160}$ **89 R 40**

27. $70 \overline{)5600}$ **80**

28. $94 \overline{)9120}$ **97 R 2**

29. $68 \overline{)3026}$ **44 R 34**

30. $92 \overline{)7758}$ **84 R 30**

31. $38 \overline{)1469}$ **38 R 25**

32. $79 \overline{)6758}$ **85 R 43**

33. $82 \overline{)7186}$ **87 R 52**

34. $67 \overline{)4395}$ **65 R 40**

35. $48 \overline{)2544}$ **53**

36. $63 \overline{)5711}$ **90 R 41**

Solve.

37. Trains depart from the Regina station at 9:00 AM, 10:30 AM, and 1:45 PM. If you miss the first train by 5 minutes, how long must you wait for the next train?

1 h 25 min

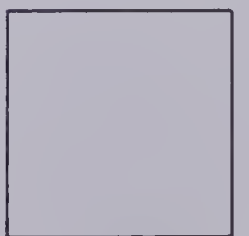
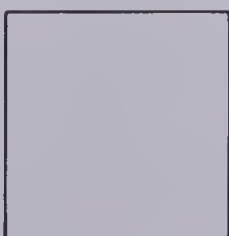
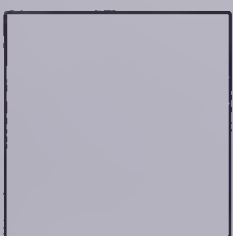
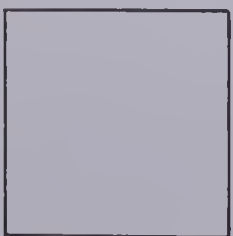
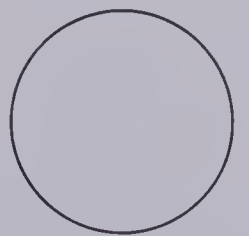
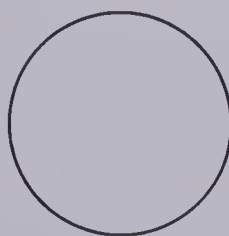
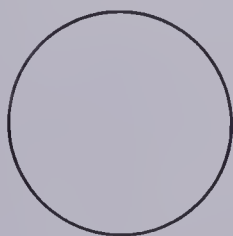
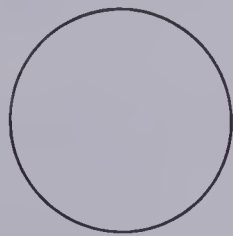
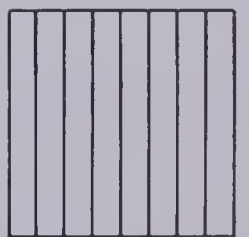
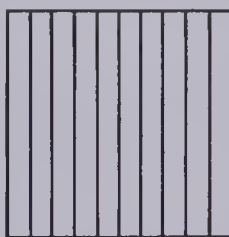
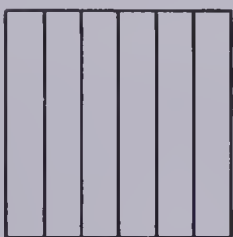
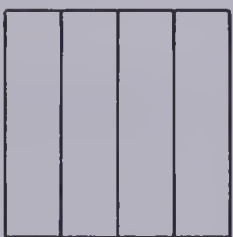
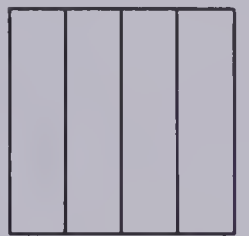
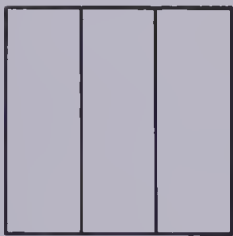
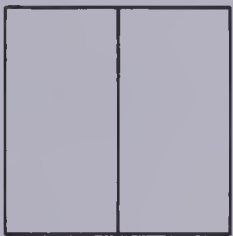
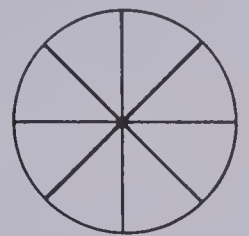
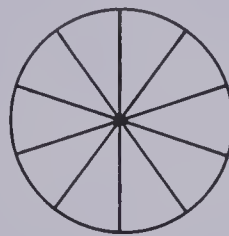
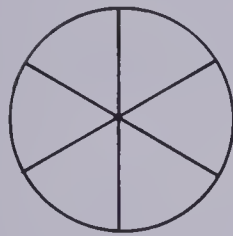
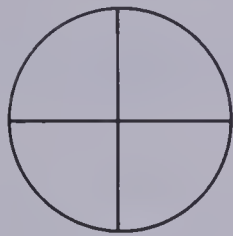
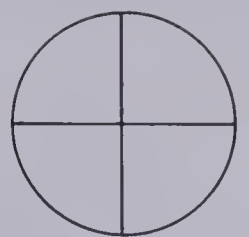
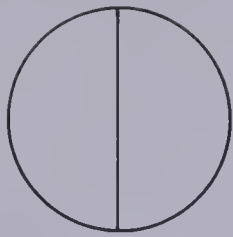
UNIT 7

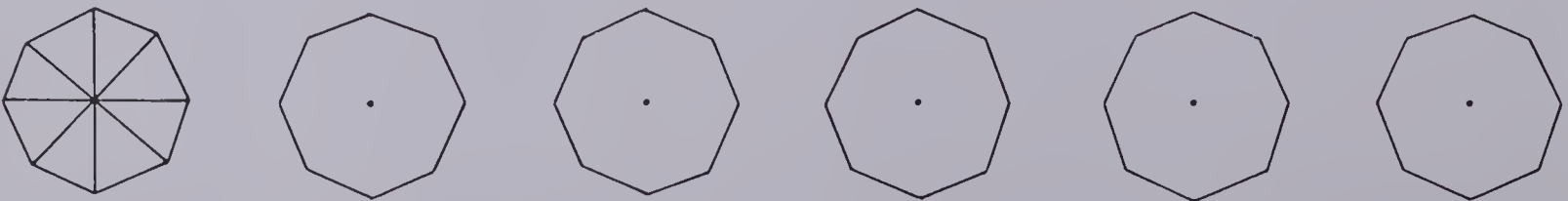
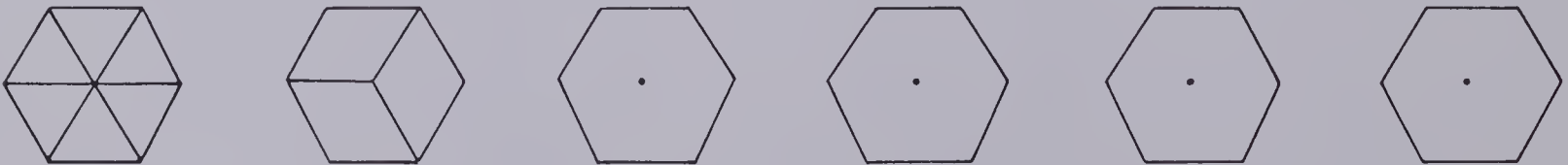
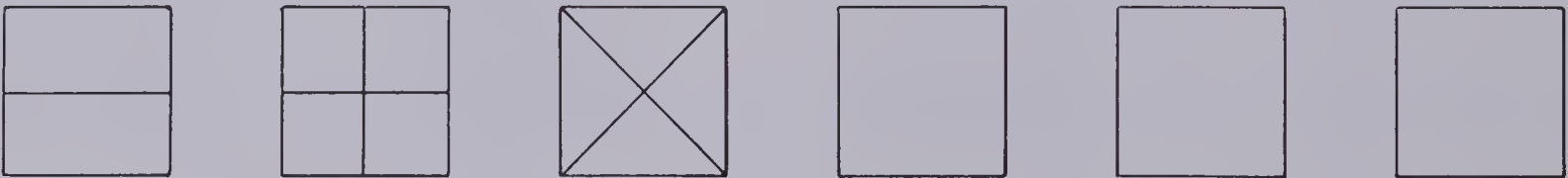
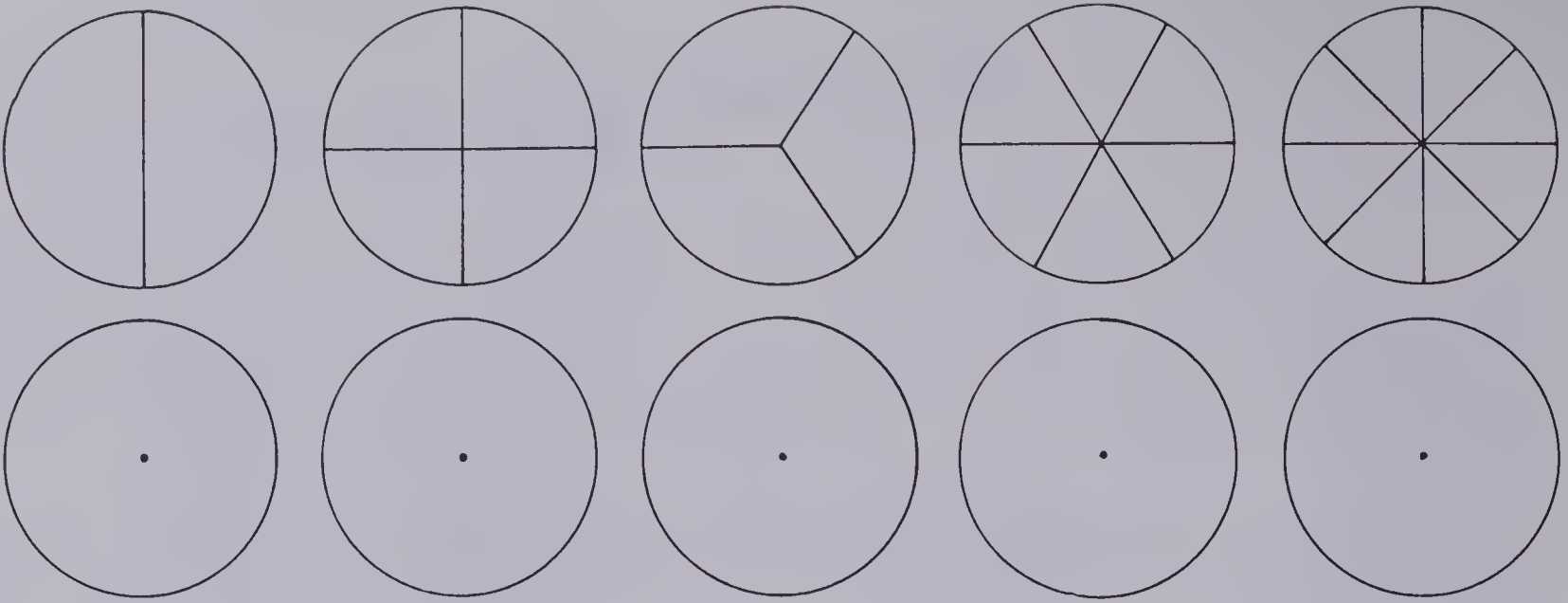
Fractions and Ratios

Theme: Canadiana

Lesson		Objective	Pages
Preview		Write the fraction for part of a whole.	145
1	N11	Write the fraction for part of a set.	146-147
2	A34	Find the fractional part of a set using unit fractions.	148-149
3	A35	Find the fractional part of a set using more than unit fractions.	150-151
4	N12	Understand ratio.	152-153
5	N13	Express and generate proportional ratios.	154-155
6	N14	Solve for the missing number in proportional ratios.	156-157
7	N15	Write equivalent fractions.	158-159
8	N16	Find the decimal equivalents of fractions.	160-161
9	N17	Compare fractions.	162-163
10	PS6	Recognize word problems with insufficient information.	164-165
Test		Fractions and ratios	166
Review		Multiplication and division	167

Fractional Parts





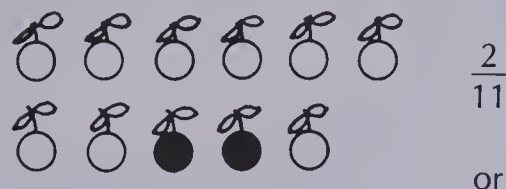
About This Unit

Students will be using fractions in a variety of ways in this unit.

a. as a part of a whole



b. as a part of a set



or



c. as a way to write a ratio



Fractions are also related to their decimal equivalents in this unit. Hence, an understanding of base ten place value to hundredths is an important prerequisite.

$$\frac{3}{4} = 0.75 \quad \frac{1}{20} = 0.05$$

Finding equivalent fractions and comparing fractions arithmetically is introduced at this level. In Grade 4, for example, equivalent fractions were found through the use of illustrations alone.



At this level, students will be multiplying or dividing the numerator and denominator by equivalents of 1 to find fraction equivalents.

$$\frac{2}{3} \left(\frac{\times 2}{\times 2} \right) = \frac{4}{6}$$

$$\frac{15}{24} \left(\frac{\div 3}{\div 3} \right) = \frac{5}{8}$$

Finding the missing term in a proportion also is introduced at this level using the same method as that used for finding equivalent fractions.

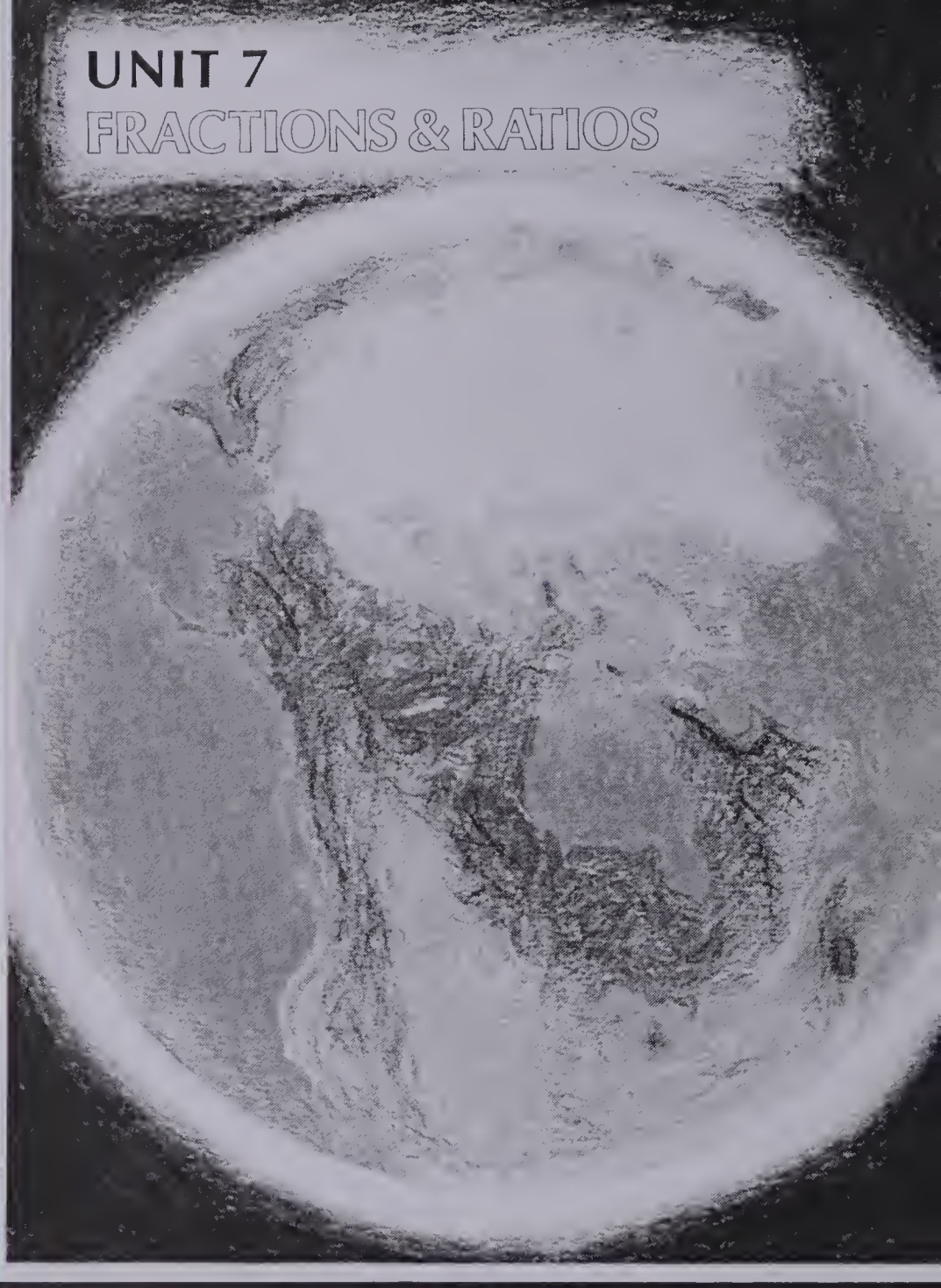
The lessons are sequential and it is necessary that they be studied in the order given. The many suggested uses of manipulative devices are important as the students internalize the concepts.

Ideas

The theme, *Canadiana*, provides many fraction examples for this unit. A good resource book on the flags, crests, and flowers of the provinces and territories is *The Arms, Flags and Emblems of Canada* (Ottawa, 1978, by Deneau and Greenberg in cooperation with the Secretary of State Department).

UNIT 7

FRACTIONS & RATIOS

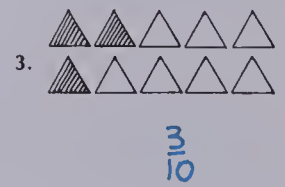
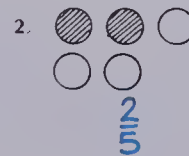
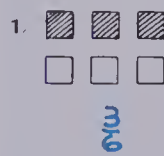


Unit 7 Objectives	Test Questions	Pages
N11	1-3	146-147
A34	4-7	148-149
A35	8-9	150-151
N12	10-11	152-153
N13	12-13	154-155
N14	14-17	156-157
N15	18-20	158-159
N16	21-24	160-161
N17	25-28	162-163

Pretest

Unit 7

What fraction of the set is shaded?



Complete

4. $\frac{1}{2} \times 10 = \underline{5}$

5. $\frac{1}{3} \times 12 = \underline{4}$

6. $\frac{1}{4} \times 20 = \underline{5}$

7. $\frac{1}{6} \times 18 = \underline{3}$

8. $\frac{2}{3} \times 9 = \underline{6}$

9. $\frac{3}{10} \times 30 = \underline{9}$

Write the ratio.

10. 5 dogs to 2 cats $\frac{5}{2}$

11. 3 skateboards to 7 bicycles $\frac{3}{7}$

Fraction Flags

What fraction of the flag is coloured? Match the letter of the flag to a fraction below.

R	N	O
A	D	F
A	H	Y
C	R	U
R	A	A

H	U	R	R	A	Y	F	O	R	C	A	N	A	D	A
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
$\frac{1}{9}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{2}{6}$	$\frac{4}{6}$	$\frac{3}{10}$	$\frac{1}{4}$	$\frac{6}{12}$	$\frac{5}{6}$	$\frac{7}{8}$	$\frac{3}{5}$	$\frac{3}{6}$	$\frac{4}{8}$	$\frac{2}{5}$	$\frac{2}{4}$

145

UNIT 7

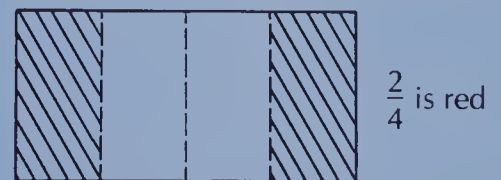
PREVIEW

Suggestions

Provide each student with a rectangular piece of paper that is twice as long as it is wide. Ask the students to fold the paper in half and to compare the parts. *They are equal.* "What do you call one part?" A *half*. Have a student record the fraction on the chalkboard. Review the meaning of the terms numerator and denominator.

$\frac{1}{2}$
 1 ← numerator
 1 ← number of parts described or considered
 2 ← number of equal parts in all
 2 ← denominator

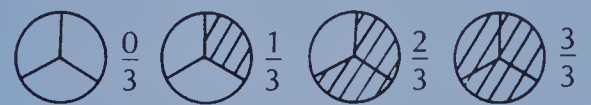
Ask the students to fold the paper in half again making four fourths. Have them colour one end section red. Discuss the fraction represented, $\frac{1}{4}$. Have them colour the other end red. See that they realize that $\frac{2}{4}$ of the paper is now shaded red.



Ask what part of the paper is white. Have the students sketch a maple leaf on the white $\frac{2}{4}$ of the flag.

Draw several rectangles on the chalkboard. Divide them into equal sections and shade fractional parts of these rectangles. For each, have the students name the number of equal parts, the number of shaded parts, and then write the fraction.

Illustrate also *fraction families* for the students to identify.



Discuss how 0 out of 3 parts is $\frac{0}{3}$ or 0 and how 3 out of 3 parts is $\frac{3}{3}$ or 1 whole.

About the Page

After the above review of fractional parts of a whole, students should not have any difficulty with page 145. The code is intended as a self-checking device.

Complete.

12. $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$ 13. $\frac{15}{20} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$
 14. $\frac{3}{6} = \frac{1}{2}$ 15. $\frac{1}{4} = \frac{4}{16}$ 16. $\frac{9}{12} = \frac{3}{4}$ 17. $\frac{2}{3} = \frac{10}{15}$
 18. $\frac{3}{4} = \frac{6}{8} = \frac{9}{12}$ 19. $\frac{5}{3} = \frac{10}{6} = \frac{20}{12}$ 20. $\frac{16}{24} = \frac{4}{6} = \frac{2}{3}$

Write as decimals.


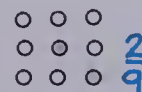


21. $\frac{4}{5} = 0.\underline{8}$ 22. $\frac{7}{10} = 0.\underline{7}$ 23. $\frac{3}{100} = 0.\underline{03}$ 24. $\frac{1}{4} = 0.\underline{25}$

Compare the fractions. Write < or >.

25. $\frac{4}{7} > \frac{3}{7}$ 26. $\frac{3}{3} > \frac{2}{3}$ 27. $\frac{1}{2} > \frac{5}{12}$ 28. $\frac{3}{4} < \frac{7}{8}$

PRACTICE

What fraction of the set is shaded?

-  $\frac{3}{4}$
-  $\frac{2}{9}$
-  $\frac{0}{6}$
-  $\frac{7}{7}$

Is 8 the numerator or the denominator?

- $\frac{8}{9}$ n.
- $\frac{5}{8}$ d.
- $\frac{8}{12}$ n.
- $\frac{8}{11}$ n.
- $\frac{1}{8}$ d.
- $\frac{8}{8}$ both

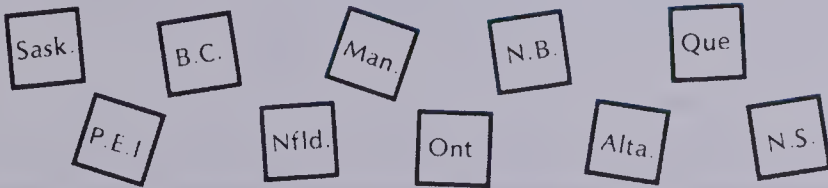
Write the fraction.

- three fifths $\frac{3}{5}$
- two thirds $\frac{2}{3}$
- five sevenths $\frac{5}{7}$
- seven tenths $\frac{7}{10}$
- zero fourths $\frac{0}{4}$
- eight ninths $\frac{8}{9}$
- Eleven birds. 4 of the 11 stay in Canada for the winter. $\frac{4}{11}$
- Five animals. 3 of the 5 live only in wilderness areas. $\frac{3}{5}$
- Three out of eight flowers bloom in Spring. $\frac{3}{8}$

Our Provinces

Write the fraction. Name the provinces.

- Four of the ten provinces have names with two or more words. $\frac{4}{10}$ B.C., N.B., P.E.I., N.S.
- Names of three of the ten provinces start with the letter "N". $\frac{3}{10}$ Nfld., N.B., N.S.
- Names of two of the ten provinces start with a vowel. $\frac{2}{10}$ Ont., Alta.
- Eight of the ten provinces border the U.S. $\frac{8}{10}$ Sask., B.C., Man., N.B., Que., Ont., Alta., N.S.
- Four of the ten provinces border the Yukon or the Northwest Territories. $\frac{4}{10}$ B.C., Alta., Sask., Man.



147

Assigning the Practice

Minimum: 1-17

Average: 1-19

Enriched: 1-19

Reinforcement

1. Assign *Our Provinces* at the bottom of page 147.

2. Write several fractions on the chalkboard. Ask individual students to draw a shaded set of objects to illustrate each.

3. Ask the students to write the fraction in each of the following statements and to identify the numerator and the denominator of the fraction.

- Two of the three cats were Persian.
- Six of the thirty children had dogs.
- There were six birds. Two of them were robins.
- Only one of the litter of three puppies was a male.
- Both raccoons climbed the tree.
- None of the twelve parents left the meeting early.

4. Students are to conduct a survey of the class to find out information such as the following.

- What fraction of the students has a dog? cat? bird? fish?
- What fraction of students has brown hair? black? blond(e)? red?
- What fraction of the students has one brother or sister? two? three?

Let the students decide on a way to display their findings.

Enrichment

1. Ask the students to research information about the set of provinces and territories and then to develop fractions from this information. For example, $\frac{3}{12}$ of the provinces and territories have cities with populations over a million.





2. Students might research information on an animal that is endangered and then prepare a poster which has drawings and a summary of the information.

Extra Practice





Worksheet N11

Pages 146-147

What fraction of the set is shaded?

-  $\frac{4}{9}$
-  $\frac{2}{12}$
-  $\frac{0}{8}$
-  $\frac{7}{15}$

Draw and shade a set of objects to show these fractions.

- $\frac{5}{6}$ 
- $\frac{3}{10}$ 
- $\frac{7}{13}$ 
- $\frac{5}{5}$ 

Write the fraction.

- There are ten provinces. Three of them border Hudson Bay. $\frac{3}{10}$
- There are twelve provinces and territories. The Rocky Mountains run through four of them. $\frac{4}{12}$

Objective A34

Find the fractional part of a set using unit fractions.

Introducing the Lesson

Discuss what a crest is. Show a picture or drawing of the crest for your province or territory. Point out the items on the crest and ask students to suggest why those items were chosen. Ask the students whether any of them have a family crest. Ask them to describe the crests and tell their meanings.

Teaching the Lesson

Sketch two sets of twelve crest shapes on the chalkboard. Ask a student to shade half of the crests in one of the sets. Ask another student to divide the other set of crests into two parts. Point out that the result of $\frac{1}{2}$ of 12 and the result of $12 \div 2$ is the same.



Show that shading half of a set is the same as dividing the set by two with several other examples.

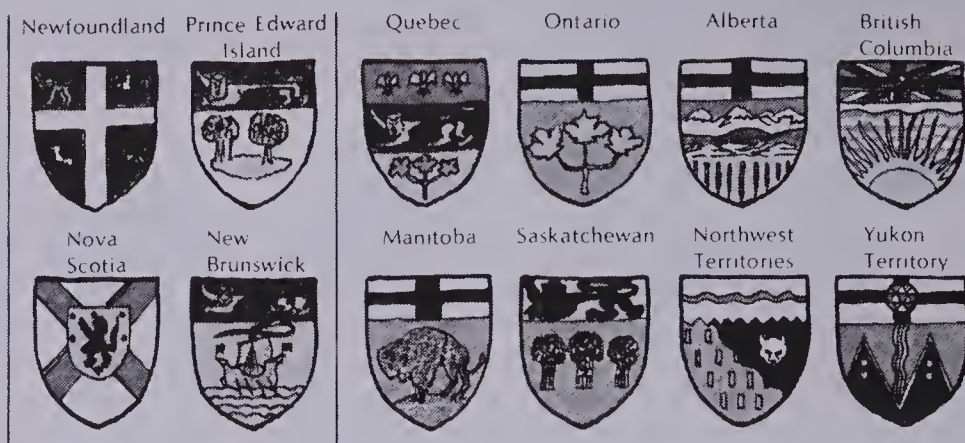
Sketch two sets of three crest shapes on the chalkboard. Have a student shade a third of one set and divide the other set into three parts. Note that the results are the same. Conclude that shading a third of a set is the same as dividing the set by three.



Illustrate $\frac{1}{3}$ of 6 and $6 \div 3$, $\frac{1}{3}$ of 9 and $9 \div 3$, etc.

Call attention to the pictures of the twelve crests on the top of page 148. Give the students ample time to examine them. Ask how many crests there are altogether. Twelve. Ask the students to name the four Maritime Provinces. Talk about how the illustration shows that $\frac{1}{3}$ of 12 is the same as $12 \div 3$, or 4 Maritime Provinces. Point out that $\frac{1}{3}$ of 12 = 4 can also be written as $\frac{1}{3} \times 12 = 4$. Stress that $\frac{1}{3} \times 12$ and $12 \div 3$ are the same.

Fractional Parts of a Set



$\frac{1}{3}$ of the 12 crests belong to the Maritime Provinces.

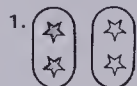
4 of the crests belong to the Maritime Provinces.

$$\frac{1}{3} \text{ of } 12 = 4$$

$$\frac{1}{3} \times 12 = 4 \quad \text{or} \quad 12 \div 3 = 4$$

EXERCISES

Copy and complete.



$$\frac{1}{2} \text{ of } 4 = \blacksquare 2$$



$$\frac{1}{4} \text{ of } 8 = \blacksquare 2$$



$$\frac{1}{5} \text{ of } 10 = \blacksquare 2$$

$$4. \quad \frac{1}{3} \times 9 = \blacksquare 3$$

$$9 \div 3 = \blacksquare 3$$

$$5. \quad \frac{1}{2} \times 10 = \blacksquare 5$$

$$10 \div 2 = \blacksquare 5$$

$$6. \quad \frac{1}{4} \times 12 = \blacksquare 3$$

$$12 \div 4 = \blacksquare 3$$

Draw a picture. Copy and complete.

$$7. \quad \frac{1}{2} \times 2 = \blacksquare 1$$

$$2 \div 2 = \blacksquare 1$$

$$8. \quad \frac{1}{3} \times 15 = \blacksquare 5$$

$$15 \div 3 = \blacksquare 5$$

$$9. \quad \frac{1}{6} \times 12 = \blacksquare 2$$

$$12 \div 6 = \blacksquare 2$$

Using the Exercises

- Do questions 1 to 3 together. Discuss how the illustrations show, for example, both $\frac{1}{2}$ of 4 and $4 \div 2$. The students can then solve $\frac{1}{2}$ of 4 by thinking $4 \div 2$.
- For questions 4 to 6 the students should see that the multiplication by a unit fraction and the division yield the same result. Sketch pictures on the chalkboard for those that need it.
- Questions 7 to 9 again involve related multiplication and division statements. The students, however, are required to make their own illustrations.

PRACTICE

Copy and complete.



$$\frac{1}{2} \times 8 = \blacksquare 4$$



$$\frac{1}{3} \times 9 = \blacksquare 3$$



$$\frac{1}{4} \times 12 = \blacksquare 3$$

4. $\frac{1}{3} \times 3 = \blacksquare 1$
 $3 \div 3 = \blacksquare 1$

5. $\frac{1}{4} \times 16 = \blacksquare 4$
 $16 \div 4 = \blacksquare 4$

6. $\frac{1}{2} \times 14 = \blacksquare 7$
 $14 \div 2 = \blacksquare 7$

Multiply.

7. $\frac{1}{5} \times 15 = 3$

8. $\frac{1}{4} \times 20 = 5$

9. $\frac{1}{2} \times 16 = 8$

10. $\frac{1}{3} \times 18 = 6$

11. $\frac{1}{2} \times 20 = 10$

12. $\frac{1}{2} \times 18 = 9$

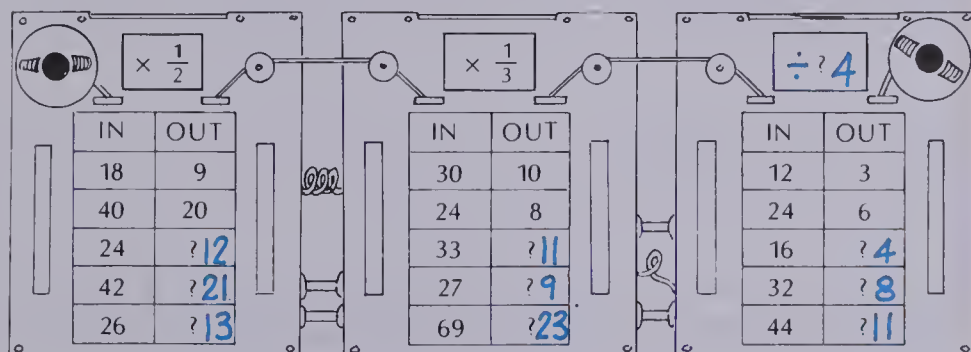
Draw a picture. Solve.

13. Tom had 12 pennies. He gave $\frac{1}{3}$ of them to his brother.

How many pennies did he give to his brother? 4

14. There are 20 cars in the parking lot. One fifth of them have Alberta license plates. How many cars have Alberta license plates? 4

Computer Tutor



149

Assigning the Practice

Minimum: 1-13

Average: 1-14

Enriched: 1-14

Reinforcement

1. Complete the following tables.

×	18
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{6}$	
$\frac{1}{9}$	

×	24
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{4}$	
$\frac{1}{6}$	
$\frac{1}{8}$	
$\frac{1}{12}$	

×	36
$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{4}$	
$\frac{1}{6}$	
$\frac{1}{9}$	
$\frac{1}{12}$	

2. Prepare a set of cards showing problems in the following three forms.

$$\frac{1}{3} \text{ of } 27$$

$$\frac{1}{3} \times 27$$

$$27 \div 3$$

Flash the cards for a quick oral drill or use the cards to play a card game similar to "Rummy".

Enrichment

1. Assign *Computer Tutor* at the bottom of page 149.

2. Ask the students to complete the following equations.

a. $\frac{1}{6}$ of $\blacksquare = 9$

b. $\frac{1}{10}$ of $\blacksquare = 10$

c. $\frac{1}{8}$ of $\blacksquare = 8$

d. $\frac{1}{4}$ of $\blacksquare = 1$

e. $\frac{1}{7}$ of $\blacksquare = 3$

f. $\frac{1}{9}$ of $\blacksquare = 5$

3. Assign each of twelve small groups of students a provincial or territorial crest to research the meaning of its features. Have the groups report their findings to the class.

Extra Practice

Complete.

1. $\frac{1}{2}$ of 14 = 7 2. $\frac{1}{3}$ of 18 = 6 3. $\frac{1}{9}$ of 18 = 2 4. $\frac{1}{2}$ of 16 = 8

5. $\frac{1}{6}$ of 18 = 3 6. $\frac{1}{8}$ of 24 = 3 7. $\frac{1}{7}$ of 28 = 4 8. $\frac{1}{4}$ of 32 = 8

Multiply.

9. $\frac{1}{4} \times 40 = 10$ 10. $\frac{1}{6} \times 42 = 7$ 11. $\frac{1}{3} \times 21 = 7$ 12. $\frac{1}{10} \times 50 = 5$

13. $\frac{1}{8} \times 40 = 5$ 14. $\frac{1}{7} \times 49 = 7$ 15. $\frac{1}{9} \times 72 = 8$ 16. $\frac{1}{6} \times 48 = 8$

Solve.

17. The provincial and territorial crests are alike in some ways.

- a. One half of them have a lion (or lions) on them. How many crests is that? 6 Name them. Nfld., P.E.I., N.S., N.B., Que., Sask.

- b. One sixth of the crests picture wheat. How many is that? 2
 Name them Saskatchewan, Alberta

Worksheet A34

Pages 148-149

Objective A35

Find the fractional part of a set using more than unit fractions.

Introducing the Lesson

Ask the students if they know what their provincial flower is. Ask them to describe it. Do they know how the provincial flowers were chosen (usually the school children of the province were asked to select the flower).

Look at the pictures of provincial flowers at the top of page 150. Discuss which ones grow in the students' own province.

Teaching the Lesson

Place a set of 12 cubes on the overhead projector. Ask a student to divide them into 4 equal groups. Note that there are 3 in each group. Record the division $12 \div 4 = 3$. Point to the 4 groups and then to 1 of the 4 groups. Ask for the fraction represented by 1 of 4 groups. *One fourth*. Show what $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$ of the cubes are. Record the corresponding multiplications.

$$12 \div 4 = 3 \quad \frac{1}{4} \times 12 = 3 \quad \frac{2}{4} \times 12 = 6$$

$$\frac{3}{4} \times 12 = 9 \quad \frac{4}{4} \times 12 = 12$$

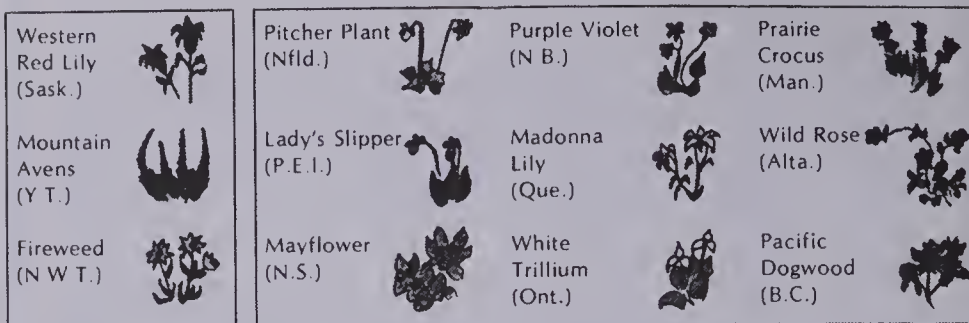
Call attention to the counting by threes pattern. Point out that since the unit fraction $(\frac{1}{4}) \times 12 = 3$, $\frac{2}{4} \times 12$ can be found by counting by threes twice; $\frac{3}{4} \times 12$ can be found by counting by threes three times; etc.

Discuss the lesson example at the top of page 150. Allow time for the students to study the information. Have them place their hand on the page so that $\frac{1}{4}$, then $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$ of the wildflowers show.

Write a multiplication on the overhead, such as $\frac{2}{3} \times 21$. Note the thirds, which tell you that 21 has been divided into 3 groups. Ask a student to show 21 cubes divided into 3 groups. Explain how to use the unit fraction, $\frac{1}{3} \times 21$, to help find $\frac{2}{3}$ of 21.

$$\frac{2}{3} \times 21 \rightarrow \frac{1}{3} \text{ of } 21 = 7 \rightarrow \text{Count by 7s twice.} = 14$$

Fractional Parts of a Set



$\frac{1}{4}$ of these 12 wildflowers do not bloom in the spring.

$$\frac{1}{4} \text{ of } 12 = 3$$

$$\frac{1}{4} \times 12 = 3$$

$\frac{3}{4}$ of these 12 wildflowers bloom in the spring.

$$\frac{3}{4} \text{ of } 12 = 9$$

$$\frac{3}{4} \times 12 = 9$$

EXERCISES

Copy and complete.



$$\frac{1}{3} \text{ of } 6 = \blacksquare 2$$

$$\frac{2}{3} \text{ of } 6 = \blacksquare 4$$

$$\frac{3}{3} \text{ of } 6 = \blacksquare 6$$



$$\frac{1}{2} \times 8 = \blacksquare 4$$

$$\frac{2}{2} \times 8 = \blacksquare 8$$



$$\frac{1}{4} \times 16 = \blacksquare 4$$

$$\frac{2}{4} \times 16 = \blacksquare 8$$

$$\frac{3}{4} \times 16 = \blacksquare 12$$

$$\frac{4}{4} \times 16 = \blacksquare 16$$

Draw a picture. Complete.

4. $\frac{1}{5}$ of 10 = $\blacksquare 2$

$$\frac{3}{5} \text{ of } 10 = \blacksquare 6$$

7. $\frac{4}{5} \times 15 = \blacksquare 12$

5. $\frac{1}{4} \times 20 = \blacksquare 5$

$$\frac{3}{4} \times 20 = \blacksquare 15$$

8. $\frac{2}{3} \times 21 = \blacksquare 14$

6. $\frac{1}{3} \times 18 = \blacksquare 6$

$$\frac{2}{3} \times 18 = \blacksquare 12$$

9. $\frac{5}{6} \times 12 = \blacksquare 10$

150

Using the Exercises

- Questions 1 to 3 involve *families* of multiplications. These help the students see the counting patterns and the usefulness of the unit fraction multiplication in solving the rest of the multiplications.
- Questions 4 to 6 involve pairs of multiplications in which the student draws a picture and then uses the unit fraction multiplication to solve the second multiplication of the pair.



$$\frac{1}{5} \text{ of } 10 = 2$$

$$\frac{3}{5} \text{ of } 10 \rightarrow \frac{1}{5} \text{ of } 10 = 2 \rightarrow \text{Count by 2s three times.} = 6$$

- Questions 7 to 9 require the student to draw an illustration and then do the solution steps mentally.

PRACTICE

Multiply.

1. $\frac{3}{5} \times 20 = 12$
2. $\frac{5}{8} \times 16 = 10$
3. $\frac{3}{4} \times 24 = 18$
4. $\frac{2}{3} \times 12 = 8$
5. $\frac{4}{5} \times 15 = 12$
6. $\frac{2}{7} \times 14 = 4$
7. $\frac{2}{3} \times 18 = 12$
8. $\frac{3}{5} \times 25 = 15$
9. $\frac{5}{6} \times 30 = 25$
10. $\frac{3}{7} \times 14 = 6$
11. $\frac{2}{3} \times 30 = 20$
12. $\frac{3}{4} \times 40 = 30$

Solve.

13. There are 18 crayons in Phil's box. Two thirds of them have never been used. How many have never been used? **12**
14. A class in Winnipeg has 24 students. Three fourths of them were born in Manitoba. How many were born in Manitoba? **18**

Willing Fractions

A rancher gave 17 horses to his 3 children. The oldest, Jane, was to get $\frac{1}{2}$ of the horses. The middle child, Fred, was to get $\frac{1}{3}$. The youngest, Barb, was to get $\frac{1}{9}$ of the horses. But you can't take $\frac{1}{2}$, $\frac{1}{3}$ or $\frac{1}{9}$ of 17.

Jane, Fred, and Barb solved the problem by borrowing an extra horse. So they now had 18 to split.

They used 17 horses and returned the borrowed one.

They were surprised by the result. Can you figure out why they had one left over? Did each of them get his or her fair share? Draw diagrams to help.



$$\begin{aligned}\frac{1}{2} \times 18 &= 9 \\ \frac{1}{3} \times 18 &= 6 \\ \frac{1}{9} \times 18 &= 2\end{aligned}$$

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{9} \neq 1$$

151

Extra Practice

Worksheet A35

Pages 150-151

Complete.

1. $\frac{1}{4}$ of 16 = **4**
2. $\frac{1}{3}$ of 27 = **9**
3. $\frac{1}{5} \times 35 = \underline{7}$
4. $\frac{1}{7} \times 14 = \underline{2}$
- $\frac{3}{4}$ of 16 = **12**
- $\frac{2}{3}$ of 27 = **18**
- $\frac{3}{5} \times 35 = \underline{21}$
- $\frac{5}{7} \times 14 = \underline{10}$
5. $\frac{2}{5} \times 15 = \underline{6}$
6. $\frac{2}{9} \times 36 = \underline{8}$
7. $\frac{4}{5} \times 25 = \underline{20}$
8. $\frac{3}{8} \times 24 = \underline{9}$
9. $\frac{5}{9} \times 18 = \underline{10}$
10. $\frac{3}{4} \times 28 = \underline{21}$
11. $\frac{3}{4} \times 12 = \underline{9}$
12. $\frac{3}{10} \times 40 = \underline{12}$
13. $\frac{5}{6} \times 24 = \underline{20}$
14. $\frac{2}{3} \times 21 = \underline{14}$
15. $\frac{5}{8} \times 40 = \underline{25}$
16. $\frac{8}{9} \times 81 = \underline{72}$

Solve.

17. Of the ten provinces in Canada, three fifths have one-word names. How many provinces is that? **6** Name them. **Ont., Que., Man., Sask., Alberta, Nfld.**

Assigning the Practice

Minimum: 1-13

Average: 1-14

Enriched: 1-14

Reinforcement

1. Show other sets of cubes on the overhead, for example 15 cubes. Have the students name *families* of multiplications.

$$15 \div 3 = 5$$

$$15 \div 5 = 3$$



$$\frac{1}{5} \times 15 = \blacksquare$$

$$\frac{1}{3} \times 15 = \blacksquare$$

$$\frac{2}{5} \times 15 = \blacksquare$$

$$\frac{2}{3} \times 15 = \blacksquare$$

$$\frac{3}{5} \times 15 = \blacksquare$$

$$\frac{3}{5} \times 15 = \blacksquare$$

$$\frac{4}{5} \times 15 = \blacksquare$$

$$\frac{5}{5} \times 15 = \blacksquare$$

2. Name the unit fraction multiplication that is needed for solving each.

a. $\frac{4}{7} \times 35$

b. $\frac{2}{3} \times 30$

c. $\frac{6}{8} \times 24$

d. $\frac{4}{9} \times 36$

e. $\frac{3}{4} \times 16$

f. $\frac{5}{6} \times 42$

3. Draw illustrations of the following.

a. $\frac{2}{3} \times 12$, $\frac{2}{3} \times 15$, $\frac{2}{3} \times 18$

b. $\frac{3}{4} \times 12$, $\frac{3}{4} \times 16$, $\frac{3}{4} \times 20$

c. $\frac{4}{5} \times 20$, $\frac{4}{5} \times 25$, $\frac{4}{5} \times 30$

d. $\frac{5}{9} \times 18$, $\frac{5}{9} \times 27$, $\frac{5}{9} \times 36$

e. $\frac{3}{7} \times 35$, $\frac{3}{7} \times 42$, $\frac{3}{7} \times 49$

Enrichment

1. Assign *Willing Fractions* at the bottom of page 151.

2. Complete the following equations.

a. $\frac{\blacksquare}{4} \times 8 = 6$

b. $\frac{\blacksquare}{8} \times 16 = 14$

c. $\frac{\blacksquare}{5} \times 35 = 21$

d. $\frac{\blacksquare}{3} \times 12 = 12$

e. $\frac{\blacksquare}{10} \times 10 = 0$

f. $\frac{\blacksquare}{9} \times 45 = 15$

g. $\frac{\blacksquare}{6} \times 6 = 1$

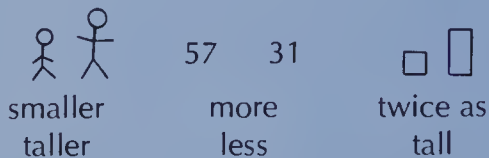
h. $\frac{\blacksquare}{2} \times 24 = 24$

Objective N12

Understand ratio.

Introducing the Lesson

Display various pairs of objects and ask the students to describe and compare them. Note the comparison terms used.



Explain that there is another way sets of objects, such as 3 apples and 2 bananas, can be compared. When a statement is written about the number of items in each set, we say that a **ratio** has been expressed.



Explain that the statement of comparison called a ratio can be written in two ways: 3 to 2 or as a fraction $\frac{3}{2}$.

Teaching the Lesson

Ask four students to stand. Give each student three pencils. Have the students compare the set of standing students to the set of pencils with a ratio.

4 standing students
12 pencils 4 to 12 or $\frac{4}{12}$

Place nine books on your desk with two erasers on each book. Have the students name the ratio of erasers to books.



Stress that the set mentioned first is written first in the ratio.

Look at the ratio examples at the top of page 152. Students cover with their hand the two girls pictured at the right and look at the girl at the left. Ask for the ratio of flags to girls (2 to 1 or $\frac{2}{1}$). Now have the students cover only one girl at the right. Ask for the ratio of flags to girls (4 to 2 or $\frac{4}{2}$). Now look at all three girls and name the ratio of flags to girls (6 to 3 or $\frac{6}{3}$).

Ratios

For the Canada Day parade, each girl in Gina's scout troop was given 2 flags to wave.



The ratio of flags to girls is 2 to 1.

2 flags for 1 girl 2 to 1 or $\frac{2}{1}$
4 flags for 2 girls 4 to 2 or $\frac{4}{2}$
6 flags for 3 girls 6 to 3 or $\frac{6}{3}$

EXERCISES

What is the ratio?

- There is 1 bicycle for each child.
The ratio is 1 to 1. $1 \text{ to } 1$
- There are 10 m of crepe paper for each bicycle.
The ratio is 10 to 1. $10 \text{ to } 1$
- There are 3 prizes for 10 children.
The ratio is 3 to 10. $3 \text{ to } 10$




Write the ratio two ways.

- 2 books for every 3 children $\frac{2}{3}$ to $\frac{3}{1}$ or $\frac{2}{3}$
- 50 leaves from every tree $50 \text{ to } 1$ or $\frac{50}{1}$
- 7 hamburgers for every 4 people $7 \text{ to } 4$ or $\frac{7}{4}$
- Each child collected 100 stamps. $1 \text{ to } 100$ or $\frac{1}{100}$
- 5 bicycles to 2 cars $5 \text{ to } 2$ or $\frac{5}{2}$
- 18 cookies in each pan $18 \text{ to } 1$ or $\frac{18}{1}$
- 100 stamps in each collection $100 \text{ to } 1$ or $\frac{100}{1}$
- 3 beavers for every 25 trees $3 \text{ to } 25$ or $\frac{3}{25}$
- 6 canoes to 12 paddles $6 \text{ to } 12$ or $\frac{6}{12}$

Using the Exercises

- Questions 1 to 3 help the student write part of the ratio. Students can concentrate on putting the objects mentioned first in the statement first in the ratio.
- Questions 4 to 12 require the students to write the ratios two ways. Ask them to read the ratios aloud.

Write the ratio two ways

1.  $6 \text{ to } 3$ $\frac{6}{3}$
2.  $8 \text{ to } 4$ $\frac{8}{4}$
3.  $4 \text{ to } 5$ $\frac{4}{5}$
4. 18 crayons to 5 pencils $\frac{18}{5}$
5. 5 trains to 9 cars $\frac{5}{9}$
6. 3 erasers to 7 mistakes $\frac{3}{7}$
7. 9 books to 4 pupils $\frac{9}{4}$
8. 4 girls to 5 boys $\frac{4}{5}$
9. 20 motorcycles to 13 bicycles $\frac{20}{13}$

Solve.

10. Joanne got 53 hits during the baseball season. 7 of her hits were home runs. Write the ratio of home runs to hits. $7 \text{ to } 53$
11. During the first half of the hockey season, Greg scored 14 goals and had 23 assists. Write the ratio of assists to total points. $23 \text{ to } 37$
12. Ms. Frank's class has 11 girls and 14 boys. What is the ratio of boys to students? $14 \text{ to } 25$

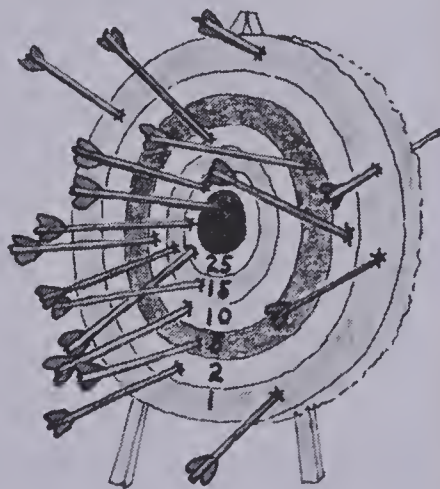
On Target

Jill, Linda, and Kathy entered an archery competition. Each archer shot 6 arrows and all the arrows hit the target. The hits are shown on the target. The three girls ended the competition with the same score. What score did each girl make?

$$\begin{array}{r} 50 \\ 10 \\ 5 \\ 1 \\ 1 \\ 1 \\ \hline 68 \end{array}$$

$$\begin{array}{r} 25 \\ 25 \\ 10 \\ 5 \\ 2 \\ 1 \\ \hline 68 \end{array}$$

$$\begin{array}{r} 25 \\ 15 \\ 15 \\ 10 \\ 2 \\ 1 \\ \hline 68 \end{array}$$



153

Assigning the Practice

Minimum: 1-10

Average: 1-12

Enriched: 1-12

Reinforcement

1. Place two sets of different shapes on the overhead projector. Have the students name and write a ratio (both ways) for each arrangement you make.

Write ratios on the chalkboard. Ask individual students to illustrate the ratios with the shapes on the overhead projector.

2. Give the students 5 squares, 4 circles, and 3 triangles to show and write the following ratios.

- a. circles to triangles
- b. squares to triangles
- c. squares to circles
- d. circles to squares
- e. triangles to circles
- f. triangles to squares

3. Show the students how to take their pulse and then ask them to write a ratio for their number of heartbeats to one minute.

4. Use the attribute blocks to devise ratios. Discuss the characteristics of the shapes (colour, size, thickness). Give the students a table in which they can record the ratios they have devised.

Describe the ratio.	Write the ratio.
red to blue	4 to 2 or $\frac{4}{2}$
large to small	7 to 6 or $\frac{7}{6}$
thin to thick	
red and thick to blue and thin	

Enrichment

1. Assign *On Target* at the bottom of page 153.

2. Have the students cut from the newspaper the standings of a few team sports. Have them write the ratios of wins to games played; losses to games played; and wins to losses.

3. Give the students ratios and have them illustrate the ratios using pictures or their own drawings. Make a display of their work.

Extra Practice

Worksheet N12

Pages 152-153

Write the ratio two ways

Describe the ratio	■ to ■	■
1. 9 trains to 5 airplanes	$9 \text{ to } 5$	$\frac{9}{5}$
2. 19 pens to 11 pencils	$19 \text{ to } 11$	$\frac{19}{11}$
3. 4 pictures to 20 pictures	$4 \text{ to } 20$	$\frac{4}{20}$
4. 35 dolls to 16 toy cars	$35 \text{ to } 16$	$\frac{35}{16}$
5. 56 men to 77 women	$56 \text{ to } 77$	$\frac{56}{77}$

Draw a picture. Write the ratio.

6. There are 2 boys and 1 girl in Ken's family. What is the ratio of
 - a. girls to boys? $1 \text{ to } 2, \frac{1}{2}$
 - b. boys to girls? $2 \text{ to } 1, \frac{2}{1}$
7. Mary was playing a dart game. In 10 throws she hit the centre 3 times. What was the ratio of hits to throws? $3 \text{ to } 10, \frac{3}{10}$

Objective N13

Express and generate proportional ratios.

Introducing the Lesson

Check that the students recall that a ratio is a comparison of two sets of objects. Give two quarters to one student. Ask for the ratio of quarters to students. *Two to one, or $\frac{2}{1}$.* Now, give another student two quarters. "What is the ratio now?" *Four to two, or $\frac{4}{2}$.* Point out that the ratio of quarters to students still equals $\frac{2}{1}$ since for every set of 2 quarters, there is 1 student. Write the statement of equality on the chalkboard. Tell the students that two equal ratios are called a **proportion**.

$$\frac{2}{1} = \frac{4}{2}$$

Use quarters and students to demonstrate other proportions.

Teaching the Lesson

Show, arithmetically, why the ratios $\frac{2}{1}$ and $\frac{4}{2}$ are equal. Write the following on the chalkboard and see if the students can determine what happened to the numerator, 2, to become 4 and what happened to the denominator, 1, to become 2.

$$\frac{2}{1} \xrightarrow{\begin{matrix} \square \\ \square \end{matrix}} \frac{4}{2} \rightarrow \frac{2(\times 2)}{1(\times 2)} = \frac{4}{2}$$

The students should see that both the numerator and denominator were multiplied by 2. Students should do the same for the other proportions.

Point out that in order to make a proportion, both the numerator and the denominator of the ratio must be multiplied by the same number.

Give 6 students 4 quarters. Record the ratio of quarters to students. Separate the students into two equal sets. Ask the students to name another ratio of quarters to students. *Three to two.* Record this ratio. Ask, "Are the two ratios equal?" Follow the same procedure for determining what happened to the numerator and denominator. Explain that the numerator and denominator of a ratio also can be divided by the same number to make a proportion.

Proportion

Leon counted his coins. He had 9 dimes and 6 nickels. What was the ratio of dimes to nickels?

$$\frac{9 \text{ dimes}}{6 \text{ nickels}} \text{ or } \frac{9}{6}$$

He sorted the coins into sets.



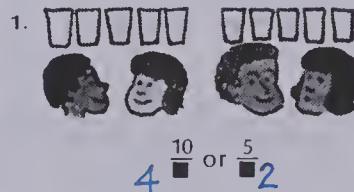
What is the ratio of dimes to nickels in each set? $\frac{3}{2}$

$$\frac{9 \text{ dimes}}{6 \text{ nickels}} = \frac{3 \text{ dimes}}{2 \text{ nickels}} \quad \frac{9}{6} = \frac{9 \div 3}{6 \div 3} = \frac{3}{2}$$



EXERCISES

Write two ratios.



Copy and complete.

3. $\frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

4. $\frac{8}{16} = \frac{8 \div 8}{16 \div 8} = \frac{1}{2}$

5. $\frac{2}{5} = \frac{2 \times 5}{5 \times 5} = \frac{10}{25}$

6. $\frac{16}{12} = \frac{16 \div 4}{12 \div 4} = \frac{4}{3}$

7. $\frac{3}{20} = \frac{3 \times 2}{20 \times 2} = \frac{6}{40}$

8. $\frac{30}{15} = \frac{30 \div 15}{15 \div 15} = \frac{2}{1}$

Copy and complete the chart.

9.

3	6	9	12	15	18
5	10	15	20	25	30

Using the Exercises

- Questions 1 and 2 should be answered by counting the sets of glasses and comparing them to the sets of children, and counting the sets of stars and comparing them to the sets of circles. Discuss why these are proportional ratios.



$$\frac{10 \div 2}{4 \div 2} = \frac{5}{2} \quad \frac{9 \div 3}{12 \div 3} = \frac{3}{4}$$

- Questions 3 to 8 give the students practice in using both multiplication and division to write a proportion.
- Although most students will use counting by threes and fives to complete the chart, point out that it shows a series of ratios that are proportional to the key ratio, $\frac{3}{5}$. Discuss what happened to the numerator, 3, and to the denominator, 5, as each proportional ratio was named.

$$\frac{3 \times 2}{5 \times 2} = \frac{6}{10} \quad \frac{3 \times 3}{5 \times 3} = \frac{9}{15} \quad \frac{3 \times 4}{5 \times 4} = \frac{12}{20} \quad \frac{3 \times 5}{5 \times 5} = \frac{15}{25} \quad \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$$

PRACTICE

Write two ratios.

1.  $\frac{2}{4}$ $\frac{1}{2}$
2.  $\frac{6}{4}$ $\frac{3}{2}$

Copy and complete the chart.

2	4	6	8	10	16
15¢	30¢	45¢	60¢	75¢	120¢

Copy and complete.


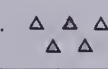
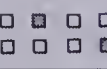
4. $\frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{8}{10}$ 5. $\frac{10}{15} = \frac{10 \div 5}{15 \div 5} = \frac{2}{3}$ 6. $\frac{1}{6} = \frac{1 \times 3}{6 \times 3} = \frac{3}{18}$
7. $\frac{12}{18} = \frac{12 \div 6}{18 \div 6} = \frac{2}{3}$ 8. $\frac{3}{7} = \frac{3 \times 4}{7 \times 4} = \frac{12}{28}$ 9. $\frac{10}{30} = \frac{10 \div 10}{30 \div 10} = \frac{1}{3}$

Solve.

10. A city council has 2 members from every ward. If there are 20 members on the council, how many wards are there? **10**

REVIEW

What fraction of the set is shaded?

- N11 1.  $\frac{2}{4}$ 2.  $\frac{3}{5}$ 3.  $\frac{2}{8}$

Multiply.

- A34 4. $\frac{1}{2} \times 12$ **6** 5. $\frac{1}{4} \times 16$ **4** 6. $\frac{1}{3} \times 9$ **3**
- A35 7. $\frac{2}{3} \times 15$ **10** 8. $\frac{3}{7} \times 14$ **6** 9. $\frac{4}{5} \times 20$ **16**

What is the ratio?

- N12 10. 3 pencils for each student $\frac{3}{1}$ 11. 3 tickets for 25¢ $\frac{3}{25}$

Copy and complete.

- N13 12. $\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$ 13. $\frac{25}{30} = \frac{25 \div 5}{30 \div 5} = \frac{5}{6}$

155

Assigning the Practice

Minimum: 1-10

Average: 1-10

Enriched: 1-10

Review Exercises

Questions	Objective	Pages
1-3	N11	146-147
4-6	A34	148-149
7-9	A35	150-151
10-11	N12	152-153
12-13	N13	154-155

Reinforcement

1. Prepare cards illustrating proportional ratios. Divide the class into two teams. Show a card to a member of one team who must write a proportion from the illustration. A correct response earns a point for the team. Show the next card to the other team. The highest number of points wins the game for the team.

2. Ask the students to name familiar card games in which players are dealt a hand of cards to start. Record the number of cards dealt to one player in a chart and have the students continue the chart with proportional ratios that tell the number of cards dealt to two, three, four, etc. players. For example:

Rummy

Cards	5			
Players	1	2	3	4

Enrichment

Have the students research the population of their city or area and other facts about life in their area, such as number of movie theatres, high schools, libraries, department stores, recreation centres, indoor skating rinks, etc. Ask them to write a ratio for each, using the facts researched, and then to simplify the ratio. (In some cases it would be best to use rounded figures.) For example:


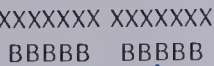
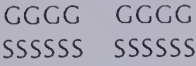
$$\frac{\text{people}}{\text{indoor skating rinks}} = \frac{100\ 000}{20} = \frac{5000}{1}$$

Extra Practice

Worksheet N13

Pages 154-155

Write two ratios.

1.  $\frac{2}{4}$, $\frac{4}{8}$ 2.  $\frac{7}{5}$, $\frac{14}{10}$ 3.  $\frac{4}{6}$, $\frac{8}{12}$

Complete.

4. $\frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$ 5. $\frac{12}{16} = \frac{12 \div 4}{16 \div 4} = \frac{3}{4}$ 6. $\frac{1}{8} = \frac{1 \times 3}{8 \times 3} = \frac{3}{24}$
7. $\frac{20}{25} = \frac{20 \div 5}{25 \div 5} = \frac{4}{5}$ 8. $\frac{5}{9} = \frac{5 \times 4}{9 \times 4} = \frac{20}{36}$ 9. $\frac{18}{36} = \frac{18 \div 18}{36 \div 18} = \frac{1}{2}$

Draw a picture. Write a proportion.

10. Max and his friend helped the balloon seller carry balloons to the park. Each boy had 8 balloons in each hand. How many balloons were they carrying? **32 balloons**

Objective N14

Solve for the missing numbers in proportional ratios.

Introducing the Lesson

Ask the students to look at the illustrations at the top of page 156. Review the formation of a proportion from a ratio by either multiplying or dividing the numerator and the denominator of the ratio by the same number. Have the students devise other proportions using the ratios of 1 beaver to 3 trees and 10 dimes to 4 quarters.

Teaching the Lesson

Ask the students to set up a ratio of the number of windows to your classroom, for example, 5 to 1. Ask, "If there were 9 classrooms just like ours, how many windows would that be?" Show the students the proportion that helps solve the problem.

$$\begin{array}{l} \text{windows} \\ \text{rooms} \end{array} \quad \frac{5}{1} = \frac{?}{9} \rightarrow \frac{5(\times 9)}{1(\times 9)} = \frac{45}{9}$$

Since a numerator is missing, the missing number in the proportion is found by looking at the denominators. Ask, "What was done to 1 to get 9?" *Multiply by nine.* Explain that the numerator, 5, then must also be multiplied by 9. Thus, there would be 45 windows for 9 classrooms.

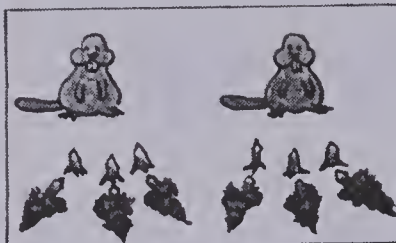
Show four small paper cups which have 9 peanuts in each and an equal unknown number of raisins in each. Tell the class that you used 36 nuts and 48 raisins in all. Ask, "How many raisins are in one cup?" Show the class a proportion that helps solve the problem.

$$\begin{array}{l} \text{nuts} \\ \text{raisins} \end{array} \rightarrow \frac{36}{48} = \frac{9}{?} \rightarrow \frac{36(\div 4)}{48(\div 4)} = \frac{9}{12}$$

Point out that the denominator is missing so the numerators are looked at for the rule. "What was done to 36 to get 9?" *Divide by four.* After dividing 48 by 4 also, it is determined that each cup had 12 raisins.

After the students see that proportions help solve problems, have them supply the missing term in several proportions recorded on the chalkboard.

Proportional Ratios



1 beaver to 3 trees
2 beavers to 6 trees

$$\frac{1}{3} = \frac{2}{6}$$

$$\frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$



10 dimes to 4 quarters
5 dimes to 2 quarters

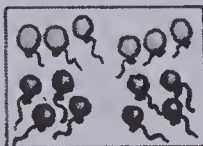
$$\frac{10}{4} = \frac{5}{2}$$

$$\frac{10 \div 2}{4 \div 2} = \frac{5}{2}$$

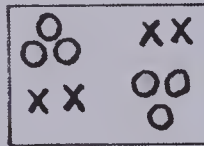
EXERCISES

Write a pair of ratios suggested by the picture.

1.



2.



3.



Find the missing term.

4.

$$\frac{3}{5} = \frac{\square}{10}$$

5.

$$\frac{5}{8} = \frac{\square}{16}$$

6.

$$\frac{1}{4} = \frac{\square}{12}$$

7.

$$\frac{2}{3} = \frac{\square}{9}$$

8.

$$\frac{3}{4} = \frac{6}{\square}$$

9.

$$\frac{3}{2} = \frac{9}{\square}$$

10.

$$\frac{1}{3} = \frac{4}{\square}$$

11.

$$\frac{4}{5} = \frac{20}{\square}$$

12.

$$\frac{20}{24} = \frac{\square}{6}$$

13.

$$\frac{18}{24} = \frac{\square}{4}$$

14.

$$\frac{9}{12} = \frac{3}{\square}$$

15.

$$\frac{10}{15} = \frac{2}{\square}$$

16.

$$\frac{\square}{7} = \frac{9}{21}$$

17.

$$\frac{\square}{5} = \frac{10}{50}$$

18.

$$\frac{4}{\square} = \frac{20}{30}$$

19.

$$\frac{6}{\square} = \frac{1}{2}$$

156

Using the Exercises

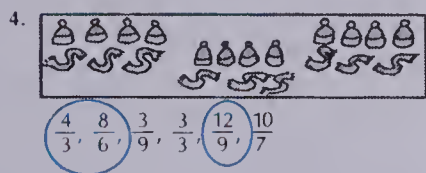
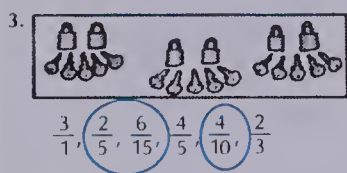
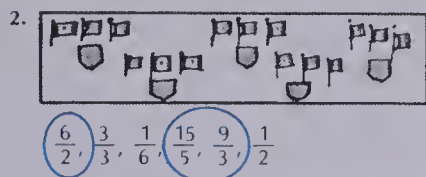
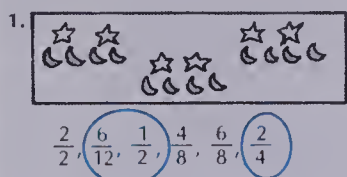
- Questions 1 to 3 give practice in recognizing and writing proportions.
- Questions 4 to 19 require the student to find the missing term in a proportion. For questions 4 to 11, multiplication is needed to find the missing term. For questions 12 to 15, division is needed. Questions 16 to 19 have a missing term in the ratio at the left. See that the students follow the same procedure for these, too.

$$\frac{\square}{7} = \frac{9}{21} \rightarrow \frac{9 \div 3}{21 \div 3} = \frac{3}{7}$$

$$\frac{6}{\square} = \frac{1}{2} \rightarrow \frac{1 \times 6}{2 \times 6} = \frac{6}{12}$$

PRACTICE

Which ratios show the comparisons in the picture?

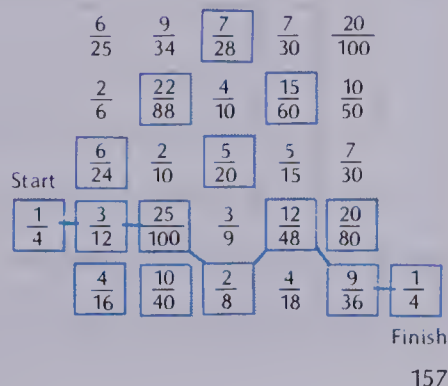


Find the missing term.

5. $\frac{6}{10} = \frac{\blacksquare}{100}$ **60** 6. $\frac{18}{27} = \frac{2}{\blacksquare}$ **3** 7. $\frac{\blacksquare}{1} = \frac{56}{8}$ **7** 8. $\frac{21}{\blacksquare} = \frac{7}{8}$ **24**
9. $\frac{\blacksquare}{8} = \frac{15}{40}$ **3** 10. $\frac{24}{36} = \frac{\blacksquare}{9}$ **6** 11. $\frac{9}{10} = \frac{27}{\blacksquare}$ **30** 12. $\frac{5}{\blacksquare} = \frac{1}{2}$ **10**
13. $\frac{7}{1} = \frac{\blacksquare}{9}$ **63** 14. $\frac{\blacksquare}{20} = \frac{5}{100}$ **1** 15. $\frac{3}{\blacksquare} = \frac{18}{48}$ **8** 16. $\frac{1}{3} = \frac{\blacksquare}{54}$ **18**
17. $\frac{40}{\blacksquare} = \frac{4}{5}$ **50** 18. $\frac{10}{25} = \frac{30}{\blacksquare}$ **75** 19. $\frac{\blacksquare}{5} = \frac{4}{1}$ **20** 20. $\frac{200}{500} = \frac{\blacksquare}{100}$ **40**

Ratio Raceway

Copy the chart. Mark ratios that are equal to $\frac{1}{4}$ to find a path through the blocks. Use blocks that have sides or corners touching. There is more than one path through the blocks.



157

Assigning the Practice

Minimum: 1-16

Average: 1-20

Enriched: 1-20

Reinforcement

1. Assign *Ratio Raceway* at the bottom of page 157.

2. Make three sets of the following dominoes.

$\frac{1}{2}$	$\frac{3}{5}$	$\frac{6}{8}$	$\frac{3}{6}$	$\frac{6}{9}$	$\frac{3}{4}$	$\frac{6}{10}$	$\frac{12}{16}$
$\frac{2}{3}$	$\frac{12}{20}$	$\frac{9}{12}$	$\frac{9}{15}$	$\frac{2}{4}$	$\frac{4}{6}$	$\frac{8}{12}$	$\frac{4}{8}$

Two or three students can play the following game. The dominoes are shuffled and placed face down. Each player takes four dominoes. The first player puts a domino face up on the table. The next player tries to play a domino that makes a proportion.

$\frac{1}{2}$	$\frac{2}{3}$
$\frac{9}{10}$	$\frac{4}{8}$

$$\frac{1}{2} = \frac{4}{8}$$

If a play cannot be made, a domino is drawn from the pile and the next player takes his or her turn. The first player to put down all of his or her dominoes wins.

Enrichment

1. Attach newspaper ads for food products to stiff cards. Write a word problem that can be solved with a proportion for each. Display the cards for the students to write the appropriate proportion and solve.

5 bars of soap
on sale
for \$1.19

How much
do 15 bars cost?

2. Ask the students to take their pulse for 10 seconds and write a ratio of heartbeats for 10 seconds. Then have them write a proportion to find their number of heartbeats in 20 seconds, 40 seconds, 60 seconds, etc.

Extra Practice

Worksheet N14

Pages 156-157

Find the missing term.

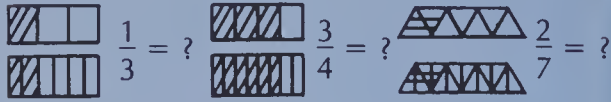
1. $\frac{1}{5} = \frac{\blacksquare}{100}$ **20** 2. $\frac{3}{4} = \frac{27}{\blacksquare}$ **36** 3. $\frac{15}{\blacksquare} = \frac{3}{2}$ **10** 4. $\frac{2}{3} = \frac{50}{\blacksquare}$ **75**
5. $\frac{\blacksquare}{6} = \frac{30}{36}$ **5** 6. $\frac{64}{72} = \frac{8}{\blacksquare}$ **9** 7. $\frac{\blacksquare}{9} = \frac{2}{3}$ **6** 8. $\frac{24}{\blacksquare} = \frac{6}{7}$ **28**
9. How many books on 5 shelves?
books shelves $\frac{25}{1} = \frac{\blacksquare}{5}$ **125**
10. How much do 9 cans cost?
cans cost $\frac{3}{80¢} = \frac{9}{\blacksquare}$ **240¢**
11. One spider has how many legs?
spiders legs $\frac{6}{48} = \frac{1}{\blacksquare}$ **8**
12. How many apples in 4 bags?
apples bags $\frac{12}{1} = \frac{\blacksquare}{4}$ **48**
13. How many days in 7 weeks?
days weeks $\frac{7}{1} = \frac{\blacksquare}{7}$ **49**
14. How many heartbeats in 10 minutes?
heartbeats minutes $\frac{72}{1} = \frac{\blacksquare}{10}$ **720**

Objective N15

Write equivalent fractions.

Introducing the Lesson

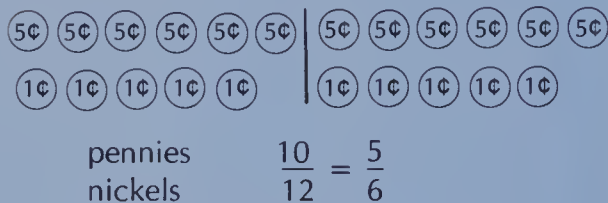
Students should generate equivalent fractions from pictures only. Show several examples like the following.



After the students determine the equivalent fractions, encourage them to use the term. One third is *equivalent* to two sixths.

Teaching the Lesson

Show a set of 10 pennies and 12 nickels arranged in two equal sets. Have the students name the two equal ratios of pennies to nickels.



Point out that fractions are a ratio of a part to the whole and that equal ratios (or a proportion) are the same as equivalent fractions.

Review how missing terms in a proportion are found (in Lesson 6). Explain that equivalent fractions are found the same way, by multiplying or dividing the numerator and denominator by the same number. Have the students practise several of the following kinds of examples.

$$\frac{7}{8} = \frac{14}{?} \rightarrow \frac{7 \times 2}{8 \times 2} = \frac{14}{16}$$

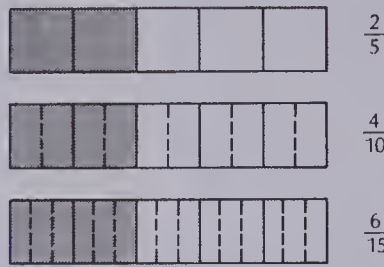
$$\frac{30}{36} = \frac{?}{6} \rightarrow \frac{30 \div 6}{36 \div 6} = \frac{5}{6}$$

Ask the students to name as many fractions as they can that are equal to $\frac{2}{3}$. Suggest that they start by multiplying the numerator and denominator by 2. Let them see that next it could be multiplied by 3, 4, 5, etc.

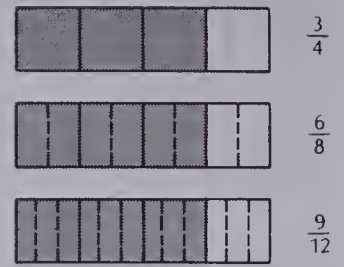
$$\frac{2 \times 2}{3 \times 2} = \frac{4}{6} \quad \frac{2 \times 3}{3 \times 3} = \frac{6}{9} \quad \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$$

Show how these equivalent fractions can also be written as $\frac{2}{3} = \frac{6}{9} = \frac{8}{12}$.

Equivalent Fractions



Equivalent fractions (same value)



Equivalent fractions (same value)

$$\frac{1 \times 2}{2 \times 2} = \frac{2}{4}$$

$$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$$

$$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$$

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$$

EXERCISES

Write equivalent fractions.

- $\frac{1}{2} = \frac{5}{10}$
- $\frac{1}{4} = \frac{2}{8}$
- $\frac{2}{5} = \frac{4}{10}$
- $\frac{2}{2} = \frac{4}{4}$
- $\frac{3}{5} = \frac{6}{10} = \frac{9}{15}$
- $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$
- $\frac{4}{5} = \frac{8}{10} = \frac{12}{15}$
- $\frac{3}{2} = \frac{6}{4} = \frac{9}{6}$
- $\frac{4}{20} = \frac{2}{10} = \frac{1}{5}$
- $\frac{18}{48} = \frac{6}{16} = \frac{3}{8}$

Using the Exercises

- For questions 1 to 4, students can use the pictures to determine the equivalent fractions.
- Questions 5 to 10 involve completing sets of three equivalent fractions. Although most students will complete these using counting patterns, point out the numbers that the numerators and denominators were multiplied or divided by.

$$\frac{3}{5} = \frac{6}{10} = \frac{9}{15}$$

$$\frac{18}{48} = \frac{6}{16} = \frac{3}{8}$$

$$\frac{3 \times 2}{5 \times 2} \quad \frac{3 \times 3}{5 \times 3}$$

$$\frac{18 \div 3}{48 \div 3} \quad \frac{18 \div 6}{48 \div 6}$$

PRACTICE

Write equivalent fractions.

1. $\frac{4}{5} = \frac{8}{10} = \frac{12}{15}$
2. $\frac{1}{6} = \frac{2}{12} = \frac{3}{18}$
3. $\frac{3}{2} = \frac{6}{4} = \frac{12}{8}$
4. $\frac{1}{10} = \frac{2}{20} = \frac{5}{50}$
5. $\frac{3}{100} = \frac{6}{200} = \frac{15}{500}$
6. $\frac{2}{9} = \frac{4}{18} = \frac{10}{45}$
7. $\frac{90}{100} = \frac{9}{10}$
8. $\frac{90}{100} = \frac{45}{50}$
9. $\frac{90}{100} = \frac{18}{20}$
10. $\frac{16}{24} = \frac{4}{6}$
11. $\frac{16}{24} = \frac{2}{3}$
12. $\frac{16}{24} = \frac{8}{12}$
13. $\frac{16}{40} = \frac{4}{10}$
14. $\frac{16}{40} = \frac{2}{5}$

Write two equivalent fractions for the shaded part of the figure.

15.  $\frac{4}{6} = \frac{2}{3}$
16.  $\frac{2}{4} = \frac{1}{2}$
17.  $\frac{7}{9} = \frac{1}{3}$

Are the pairs of fractions equivalent?

18. $\frac{1}{2}, \frac{1}{4}$ no
19. $\frac{3}{6}, \frac{12}{24}$ yes
20. $\frac{11}{10}, \frac{44}{40}$ yes
21. $\frac{1}{10}, \frac{1}{100}$ no

Match the equivalent fractions.

22. $\frac{1}{2}$ c
 23. $\frac{3}{4}$ d
 24. $\frac{2}{3}$ e
 25. $\frac{7}{10}$ b
 26. $\frac{2}{5}$ a
- a. $\frac{12}{30}$ b. $\frac{14}{20}$ c. $\frac{7}{14}$ d. $\frac{15}{20}$ e. $\frac{20}{30}$

Money Matters

Sarah found a change purse that had a number of coins in it. She noted that $\frac{1}{2}$ of the coins were nickels, $\frac{1}{3}$ were pennies, and $\frac{1}{6}$ were dimes.

There were 12 nickels. How many dimes and pennies were in the purse?

How much money was there?



4 dimes 8 pennies \$1.08

159

Assigning the Practice

Minimum: 1-14, 22-26

Average: 4-26

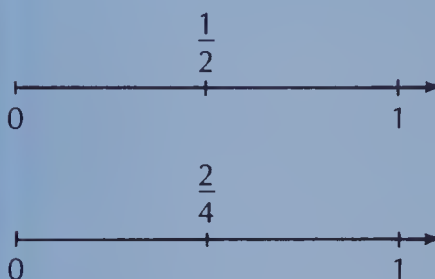
Enriched: 4-26

Reinforcement

1. Assign *Money Matters* at the bottom of page 159.

2. Give the students a sheet of number lines showing the space between 0 and 1 (similar to those shown at the bottom of page 163). Ask the students to measure and mark equal intervals as they show these equivalent fractions.

$$\frac{1}{2} = \frac{2}{4}, \frac{3}{4} = \frac{9}{12}, \frac{2}{3} = \frac{8}{12}, \text{ and } \frac{1}{3} = \frac{2}{6}.$$



Enrichment

1. Give the students a pair of blank cards. Ask them to draw illustrations of equivalent fractions, one on each card. Collect the illustrations and use them either for extra practice or for a game of "Concentration".

2. Use a multiplication table (10 × 10) to find and record different series of equivalent fractions.



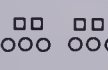
X	1	2	3	4	5	.	.	.
1	1	2	3	4	5	.	.	.
2	2	4	6	8	10	.	.	.
3	3	6	9	12	15	.	.	.
4	4	8	12	16	20	.	.	.
.
.
.

Extra Practice

Worksheet N15

Pages 158-159

Write equivalent fractions.

1.  $\frac{2}{6} = \frac{1}{3}$
2.  $\frac{4}{5} = \frac{8}{10}$
3.  $\frac{4}{10} = \frac{2}{5}$
4. $\frac{3}{7} = \frac{9}{21}$
5. $\frac{5}{9} = \frac{20}{36}$
6. $\frac{18}{20} = \frac{9}{10}$
7. $\frac{6}{5} = \frac{12}{10}$
8. $\frac{24}{28} = \frac{6}{7}$
9. $\frac{3}{8} = \frac{24}{64}$
10. $\frac{45}{54} = \frac{5}{6}$
11. $\frac{4}{6} = \frac{2}{3}$
12. $\frac{18}{24} = \frac{3}{4}$
13. $\frac{7}{9} = \frac{35}{45}$
14. $\frac{8}{8} = \frac{16}{16}$
15. $\frac{24}{36} = \frac{8}{12}$
16. $\frac{1}{10} = \frac{10}{100}$
17. $\frac{2}{9} = \frac{18}{81}$
18. $\frac{56}{64} = \frac{7}{8}$
19. $\frac{27}{45} = \frac{3}{5}$
20. $\frac{12}{20} = \frac{3}{5}$
21. $\frac{1}{7} = \frac{7}{49}$
22. $\frac{15}{24} = \frac{5}{8}$
23. $\frac{1}{20} = \frac{3}{60}$

Objective N16

Find the decimal equivalents of fractions.

Introducing the Lesson

Review expressing fractions in tenths and hundredths as decimals. Write the following on the chalkboard. Students say the fraction aloud and then record the decimal. Stress that tenths have one decimal place.

$$\frac{1}{10} \quad \frac{3}{10} \quad \frac{4}{10} \quad \frac{8}{10}$$

Discuss $\frac{10}{10}$ as the same as one whole. Ask how it would be written as a decimal. (1.0)

Write $\frac{1}{100}$, $\frac{6}{100}$, $\frac{9}{100}$, $\frac{27}{100}$, $\frac{100}{100}$ on the chalkboard and have the students read these aloud and then record them as decimals. Stress that hundredths have two decimal places.

Teaching the Lesson

Discuss the equivalent fractions illustrated at the top of page 160. Call attention to the fractions mentioned that are equivalent to $\frac{1}{2}$ and the numbers which the numerators and denominators were multiplied by to get the equivalents.

$$\frac{1 \times 5}{2 \times 5} = \frac{5}{10} \quad \frac{1 \times 50}{2 \times 50} = \frac{50}{100}$$

Explain that these equivalent fractions ($\frac{5}{10}$ and $\frac{50}{100}$) can be used to find the decimals equivalent to $\frac{1}{2}$.

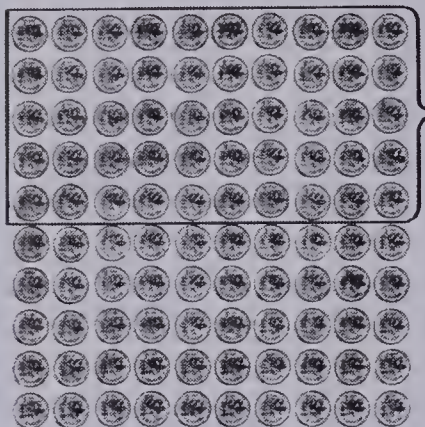
$$\frac{1}{2} = \frac{5}{10} = 0.5$$

$$\frac{1}{2} = \frac{50}{100} = 0.50$$

Point out that writing the equivalent fractions for $\frac{1}{2}$ in tenths and hundredths made it easy to write the decimal equivalents. Ask the students to write fractions equivalent to $\frac{1}{5}$ in tenths and hundredths and then to write the decimal equivalents, 0.2 and 0.20.

Explain that some fractions can have equivalent fractions in both tenths and hundredths, while others have only equivalents in hundredths. As an example ask the students to change $\frac{1}{4}$ and $\frac{11}{20}$ to decimals.

Fractions and Decimals



100 pennies

\$0.50 is half of a dollar.

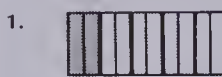
$$\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} = 0.5$$

$$\frac{1}{2} = \frac{1 \times 50}{2 \times 50} = \frac{50}{100} = 0.50$$

\$0.50 is $\frac{50}{100}$ of a dollar.

EXERCISES

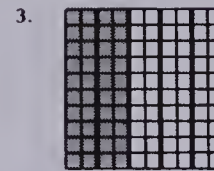
Write the equivalent fraction.



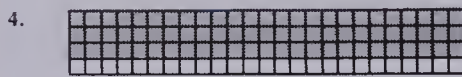
$$\frac{1}{5} = \frac{\blacksquare}{10} \quad \blacksquare = 2$$



$$\frac{3}{5} = \frac{\blacksquare}{10} \quad \blacksquare = 6$$



$$\frac{2}{5} = \frac{\blacksquare}{100} \quad \blacksquare = 40$$



$$\frac{3}{4} = \frac{\blacksquare}{100} \quad \blacksquare = 75$$

Copy and complete.

5. $\frac{1}{5} = \frac{\blacksquare}{10} = 0.\blacksquare$ $\blacksquare = 2$

6. $\frac{3}{5} = \frac{\blacksquare}{10} = 0.\blacksquare$ $\blacksquare = 6$

7. $\frac{4}{5} = \frac{\blacksquare}{10} = 0.\blacksquare$ $\blacksquare = 8$

8. $\frac{2}{5} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 40$

9. $\frac{3}{4} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 75$

10. $\frac{7}{25} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 28$

11. $\frac{4}{10} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 40$

12. $\frac{3}{50} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 6$

13. $\frac{1}{20} = \frac{\blacksquare}{100} = 0.\blacksquare\blacksquare$ $\blacksquare = 05$

Using the Exercises

- Questions 1 to 4 help the students to find equivalent fractions by supplying illustrations.
- Questions 5 to 13 direct the students to write equivalent fractions in tenths or in hundredths, and then to write the decimal equivalent.

PRACTICE

Write the equivalent fraction.

1. $\frac{1}{2} = \frac{\blacksquare 5}{10}$ 2. $\frac{2}{5} = \frac{\blacksquare 4}{10}$ 3. $\frac{3}{20} = \frac{\blacksquare 15}{100}$ 4. $\frac{2}{50} = \frac{\blacksquare 4}{100}$

Copy and complete.

5. $\frac{1}{2} = \frac{\blacksquare 5}{10} = 0.\blacksquare 5$ 6. $\frac{3}{5} = \frac{\blacksquare 6}{10} = 0.\blacksquare 6$ 7. $\frac{7}{10} = 0.\blacksquare 7$
 8. $\frac{4}{5} = \frac{\blacksquare 80}{100} = 0.\blacksquare \blacksquare$ 9. $\frac{1}{4} = \frac{\blacksquare 25}{100} = 0.\blacksquare \blacksquare$ 10. $\frac{81}{100} = 0.\blacksquare \blacksquare$
 11. $\frac{7}{50} = \frac{\blacksquare 14}{100} = 0.\blacksquare \blacksquare$ 12. $\frac{11}{25} = \frac{\blacksquare 44}{100} = 0.\blacksquare \blacksquare$ 13. $\frac{3}{10} = \frac{\blacksquare 30}{100} = 0.\blacksquare \blacksquare$
 14. $\frac{4}{5} = 0.\blacksquare$ 15. $\frac{9}{10} = 0.\blacksquare$ 16. $\frac{1}{2} = 0.\blacksquare 5$ 17. $\frac{6}{100} = 0.\blacksquare \blacksquare$
 18. $\frac{10}{25} = 0.\blacksquare \blacksquare$ 19. $\frac{4}{20} = 0.\blacksquare \blacksquare$ 20. $\frac{8}{10} = 0.\blacksquare \blacksquare$ 21. $\frac{2}{5} = 0.\blacksquare \blacksquare$

USING THE CALCULATOR

Use a calculator to change these fractions to decimals.

a. $\frac{1}{2} = 0.5$ b. $\frac{2}{5} = 0.4$ c. $\frac{3}{4} = 0.75$ d. $\frac{7}{10} = 0.7$ e. $\frac{7}{100} = 0.07$
 f. $\frac{49}{100} = 0.49$ g. $\frac{27}{100} = 0.27$ h. $\frac{19}{25} = 0.76$ i. $\frac{42}{50} = 0.84$ j. $\frac{13}{20} = 0.65$
 k. $\frac{18}{20} = 0.90$ l. $\frac{4}{5} = 0.8$ m. $\frac{17}{50} = 0.34$ n. $\frac{100}{100} = 1.0$ o. $\frac{2}{2} = 1.0$

What is the decimal name for the last two fractions? **One**

$\frac{1}{2}$ means $1 \div 2$.

Punch $\boxed{1} \boxed{\div} \boxed{2} \boxed{=}$

Now you have the decimal name for $\frac{1}{2}$.



161

Assigning the Practice

Minimum: 1-17

Average: 3-19

Enriched: 5-21

Reinforcement

1. Assign *Using the Calculator* at the bottom of page 161. Explain that division can be written three ways, for example: $3 \overline{)21}$, $21 \div 3$, and as a fraction $\frac{21}{3}$.

2. Change the following *fraction families* to decimals and observe the patterns made.

a. $\frac{1}{10}, \frac{2}{10}, \frac{3}{10}, \dots, \frac{10}{10}$

b. $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}$

c. $\frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, \frac{5}{5}$

d. $\frac{1}{2}, \frac{2}{2}$

e. $\frac{1}{20}, \frac{2}{20}, \frac{3}{20}, \dots, \frac{20}{20}$

f. $\frac{1}{25}, \frac{2}{25}, \frac{3}{25}, \dots, \frac{25}{25}$

3. Show four jars. Fill one with 100 pennies, another with 20 nickels, another with 10 dimes, and the last with 4 quarters. Ask the students, in turn, to reach into one jar for a handful of coins and then record the fraction and the decimal for the part which they took.

Seven pennies taken. $\frac{7}{100}$ or 0.07

Enrichment

1. Use coin stamps to make illustrations of equivalent fractions and decimals. Show the following illustration to help the students get started.

$\frac{25}{100} = \frac{1}{4} = 0.25$

2. Use calculators to find the equivalent decimals for these pairs of fractions (as explained on page 161) in order to determine if the fractions are equal.

$\frac{6}{20}$ and $\frac{3}{10}$ $\frac{4}{5}$ and $\frac{7}{8}$ $\frac{2}{3}$ and $\frac{3}{4}$

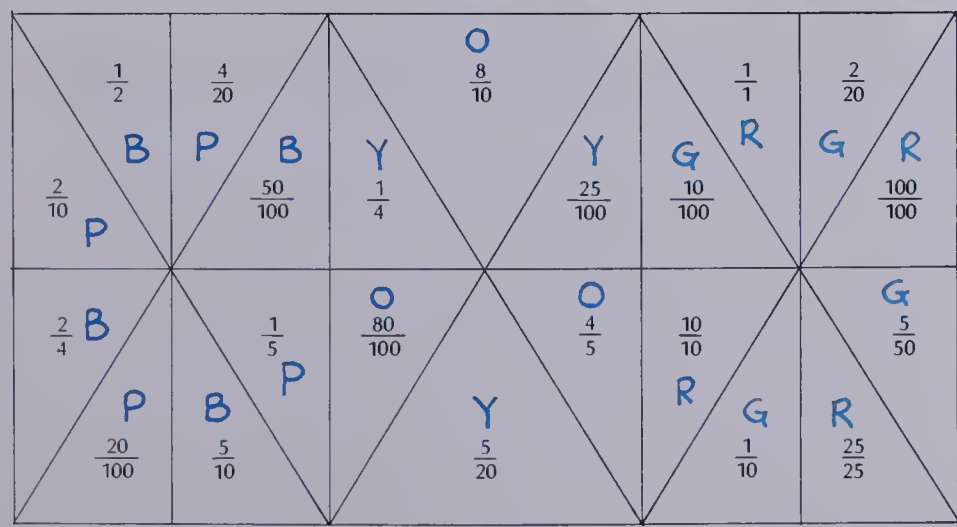
Extra Practice

Colour equivalent fractions.

Worksheet N16

Pages 160-161

0.25 yellow 0.5 blue 0.2 pink 1.0 red 0.1 green 0.8 orange



UNIT 7 LESSON 9

Objective N17

Compare fractions.

Introducing the Lesson

Give each student two strips of paper of equal size. Have them fold both strips into 6 equal sections. Ask them to shade $\frac{5}{6}$ of one strip and $\frac{4}{6}$ of the other strip and then lay the strips side by side to compare the amounts shaded. Have the students write a comparison statement about the two fractions. Point out that since the denominators are the same, only the numerators need to be compared.



$$5 > 4 \text{ so } \frac{5}{6} > \frac{4}{6}$$

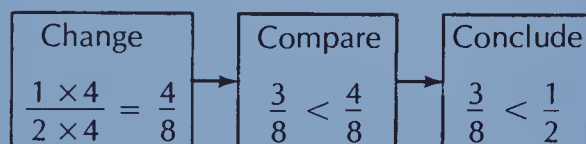
Teaching the Lesson

Write the fractions $\frac{3}{8}$ and $\frac{1}{2}$ on the chalkboard. Illustrate these two fractions on folded and shaded strips. Ask a student to record a comparison statement.



$$\frac{3}{8} < \frac{1}{2}$$

Point out that one also can compare fractions without an illustration. Explain that $\frac{3}{8}$ and $\frac{1}{2}$ do not have the same denominators. Hence, to compare them one can not just look at the numerators. Instead one fraction needs to be changed to an equivalent fraction so that both denominators are the same. Show the three steps involved.



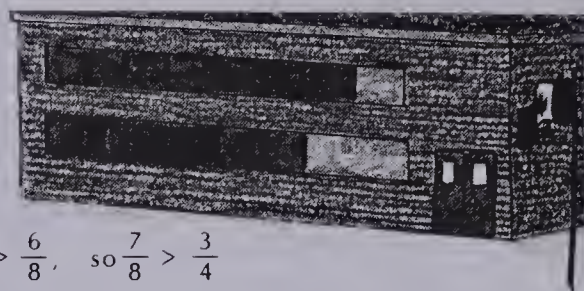
Point out the illustration and comparison of the fractions $\frac{7}{8}$ and $\frac{3}{4}$ at the top of page 162. Stress that denominators must be the same before fractions can be compared.

Students should practise comparing several other pairs of fractions with unlike denominators using the three steps: change, compare, conclude. Practice might also be given in ordering fractions with unlike denominators.

Comparing Fractions

$\frac{7}{8}$ of the shades are down.

$\frac{3}{4}$ of the shades are down.



Which is greater, $\frac{3}{4}$ or $\frac{7}{8}$?

$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8} \quad \frac{7}{8} > \frac{6}{8}, \text{ so } \frac{7}{8} > \frac{3}{4}$$

Use equivalent fractions with the **same denominator** to compare fractions.

EXERCISES

Compare the fractions. Write $>$ or $<$.

- $\frac{5}{8} \bullet \frac{2}{8}$ $>$
- $\frac{3}{7} \bullet \frac{4}{7}$ $<$
- $\frac{5}{6} \bullet \frac{6}{6}$ $<$
- $\frac{9}{10} \bullet \frac{7}{10}$ $>$

Find the missing number for \blacksquare . Write $>$ or $<$ for \bullet .

- $\frac{\blacksquare}{3} = \frac{2}{6}$ 4
- $\frac{\blacksquare}{2} = \frac{3}{4}$ 2
- $\frac{2}{3} \bullet \frac{5}{6}$ $<$
- $\frac{1}{2} \bullet \frac{3}{4}$ $<$

- $\frac{1}{2} = \frac{\blacksquare}{10}$ 5
- $\frac{3}{4} = \frac{\blacksquare}{8}$ 6
- $\frac{1}{4} = \frac{\blacksquare}{12}$ 3
- $\frac{2}{3} = \frac{\blacksquare}{12}$ 8
- $\frac{1}{2} \bullet \frac{6}{10}$ $<$
- $\frac{3}{4} \bullet \frac{5}{8}$ $>$
- $\frac{1}{4} \bullet \frac{5}{12}$ $<$
- $\frac{2}{3} \bullet \frac{7}{12}$ $>$

- $\frac{1}{3} = \frac{\blacksquare}{15}$ 5
- $\frac{3}{5} = \frac{\blacksquare}{10}$ 6
- $\frac{7}{8} = \frac{\blacksquare}{16}$ 14
- $\frac{5}{7} = \frac{\blacksquare}{14}$ 10
- $\frac{1}{3} \bullet \frac{4}{15}$ $>$
- $\frac{3}{5} \bullet \frac{7}{10}$ $<$
- $\frac{7}{8} \bullet \frac{13}{16}$ $>$
- $\frac{5}{7} \bullet \frac{9}{14}$ $>$

Think of the equivalent fractions in eighths. Then write the fractions in order.

- $\frac{7}{8}, \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{5}{8}$ $\frac{1}{4}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{7}{8}$

162

Using the Exercises

- Questions 1 to 4 require the student to compare fractions with the same denominator.
- Questions 5 to 14 require the student to compare fractions with unlike denominators. Help them as they write the change, compare, and conclude steps.
- Question 15 involves ordering fractions with unlike denominators.

PRACTICE

Compare the fractions. Write $>$ or $<$ for \bullet .

1. $\frac{5}{6} \bullet \frac{3}{6}$ 2. $\frac{11}{13} \bullet \frac{9}{13}$ 3. $\frac{19}{23} \bullet \frac{21}{23}$ 4. $\frac{14}{15} \bullet \frac{15}{15}$

Find the missing number for \blacksquare . Write $>$ or $<$ for \bullet .

5. $\frac{3}{7} = \frac{\blacksquare}{14}$ 6. $\frac{4}{5} = \frac{\blacksquare}{15}$ 7. $\frac{3}{5} = \frac{\blacksquare}{10}$ 8. $\frac{1}{2} = \frac{\blacksquare}{16}$
9. $\frac{3}{7} \bullet \frac{2}{14}$ 10. $\frac{4}{5} \bullet \frac{14}{15}$ 11. $\frac{3}{5} \bullet \frac{8}{10}$ 12. $\frac{1}{2} \bullet \frac{9}{16}$

Think of equivalent fractions with the same denominators.

Write $<$ or $>$ for \bullet .

9. $\frac{1}{2} \bullet \frac{1}{4}$ 10. $\frac{3}{5} \bullet \frac{7}{10}$ 11. $\frac{4}{6} \bullet \frac{1}{2}$ 12. $\frac{5}{6} \bullet \frac{14}{18}$
13. $\frac{7}{12} \bullet \frac{4}{6}$ 14. $\frac{1}{2} \bullet \frac{3}{4}$ 15. $\frac{9}{14} \bullet \frac{4}{7}$ 16. $\frac{1}{3} \bullet \frac{3}{6}$

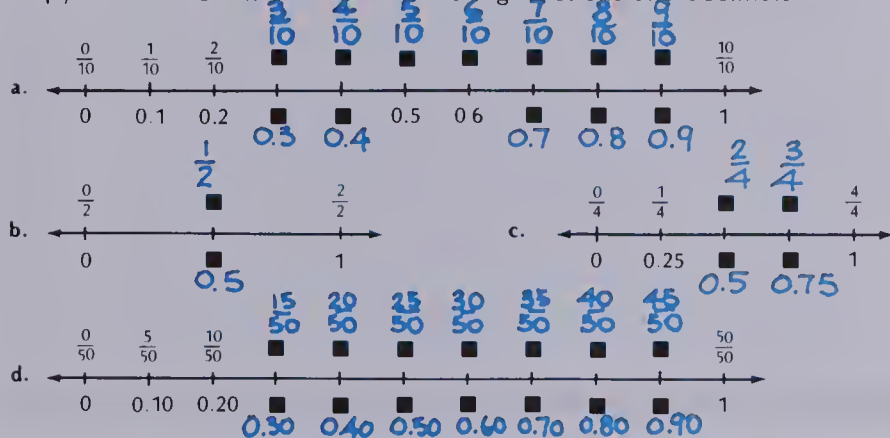
Think of equivalent fractions with the same denominator.

Write the fractions in order, starting with the smallest.

17. $\frac{4}{5}, \frac{2}{5}, \frac{3}{10}$ 18. $\frac{2}{4}, \frac{7}{16}, \frac{1}{4}, \frac{7}{16}, \frac{2}{4}$ 19. $\frac{7}{10}, \frac{15}{20}, \frac{6}{10}$

Number Line Patterns

Copy the number lines. Write the missing fractions and decimals.



163

Assigning the Practice

Minimum: 1-15

Average: 5-19

Enriched: 5-19

Reinforcement

1. Assign *Number Line Patterns* at the bottom of page 163.

2. Give the students graph paper. Ask them to trace equal-sized rectangles, divide them into equal-sized parts, and shade them to show the following comparisons.

a. $\frac{2}{3} > \frac{5}{9}$ b. $\frac{3}{4} < \frac{7}{8}$

c. $\frac{7}{10} < \frac{4}{5}$ d. $\frac{9}{16} < \frac{5}{8}$

Enrichment

1. Write $\frac{1}{2}$, $\frac{1}{10}$, and 1 on chart paper. Have the students suggest as many other ways of writing these values as they can. List all correct responses and post them.

$\frac{1}{2}$
0.5
$\frac{4}{8}$

$\frac{1}{10}$
$\frac{2}{20}$
0.1

1
$\frac{6}{6}$
1.0

2. Write equivalent fractions in sixtieths and then put all fractions in order from least to greatest.

$\frac{1}{2}, \frac{9}{15}, \frac{3}{4}, \frac{2}{3}, \frac{5}{6}, \frac{7}{12}, \frac{2}{5}, \frac{41}{60}, \frac{10}{10}$

Extra Practice

Worksheet N17

Pages 162-163

Compare the fractions. Write $<$ or $>$.

1. $\frac{1}{2} \bullet \frac{3}{4}$ 2. $\frac{4}{5} \bullet \frac{7}{10}$ 3. $\frac{5}{8} \bullet \frac{1}{2}$ 4. $\frac{1}{6} \bullet \frac{4}{18}$
5. $\frac{9}{12} \bullet \frac{5}{6}$ 6. $\frac{3}{7} \bullet \frac{7}{14}$ 7. $\frac{1}{4} \bullet \frac{5}{16}$ 8. $\frac{4}{9} \bullet \frac{1}{3}$
9. $\frac{11}{20} \bullet \frac{3}{5}$ 10. $\frac{3}{4} \bullet \frac{11}{16}$ 11. $\frac{3}{10} \bullet \frac{10}{30}$ 12. $\frac{10}{24} \bullet \frac{3}{8}$

Solve.

13. A film about Quebec lasts $\frac{3}{4}$ of an hour. A film on the Maritimes lasts $\frac{5}{8}$ of an hour. Which film is shorter? **The Maritimes film**

Objective PS6

Recognize word problems with insufficient information.

Introducing the Lesson

Review the four problem-solving steps (Identify, Decide, Evaluate, Answer) as you discuss how the following problems are solved.

- One fourth of the 32 fish in Gordon's aquarium are swordtails. How many fish are swordtails?
- Rosa's temperature climbed 1.5°C above normal. What is her temperature now?

Teaching the Lesson

Ask the students to solve the following problem next. Discuss the fact that too much information is given. Review how the unnecessary information can be discarded in the "Identify" step.

One third of the students in Mrs. Brownlee's class ride their bicycles to school. There are 30 students in the class. Seventeen of the students are boys. How many students do not ride their bicycles to school?

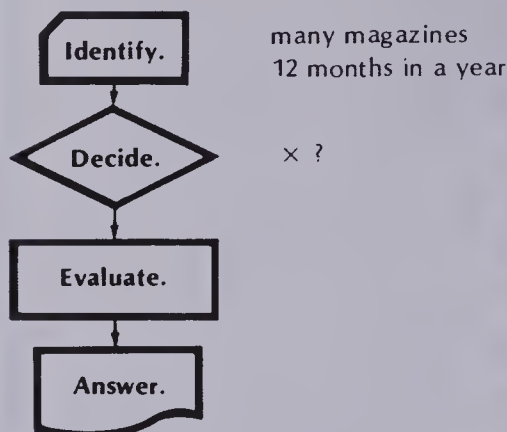
Read together the lesson example at the top of page 164. Identify the facts given. Let the students discover that this problem cannot be solved, because a fact is missing. Talk about possible facts which would be suitable for the completion of the problem and then solve it using appropriate possibilities.

Discuss the kinds of facts needed for various kinds of problem situations. "What facts are necessary to find the perimeter or the area of a playing field?" "What facts are needed to find the volume of an aquarium?" "What facts are needed to find how long it took someone to complete a job?" "What facts are needed to know how many seats there are in a movie theatre?"

Make sure that the students realize that it is always necessary to have two facts to carry out the basic arithmetic operations, and in some cases three or more facts are required.

Missing Facts

A public library receives many different nature magazines each month. How many nature magazines does it receive in one year?



EXERCISES

Solve the problem if it has the necessary facts.

Write a *missing fact* if it doesn't.

- A Canadian flag is twice as long as it is wide. If the flag is 1.5 m wide, how long is it? **3.0 m**
- The highest temperature on record for Prince Edward Island is 34.4°C . How much higher is this than their usual July temperature?
- In the first 100 years after Confederation, Canada had 20 Governor Generals. About how long was each appointment? **5 years**
- Victoria has about $\frac{1}{4}$ as much snow as Whitehorse. About how much snow does Victoria get in a year?
- In 1977, the R.C.M.P. had about 19 000 members. How many more did they have in 1982?

Using the Exercises

- Questions 2, 4, and 5 do not have enough information to be solved. Ask students to suggest reasonable facts and then solve the problems.

PRACTICE

Solve. If a problem is missing a fact, invent a suitable fact and solve the problem.

1. An apartment building has 18 apartments on each floor. How many apartments are there in the building? **20 Floors, 360**
2. John ate $\frac{1}{4}$ of 20 freshly baked cookies. How many did he eat? **5**
3. A fish tank is 50 cm long, 30 cm wide, and 30 cm high. What is its volume? **45 000 cm³**
4. Mrs. Bovier divided her class into groups of six. How many groups did she make? **30 students, 5 groups**
5. Norma filled her gas tank and went for a drive. She used half the gas in the tank. **Tank holds 30 L**
How many litres of gas did she use? **She used 15 L**

REVIEW

Find the missing terms.

- N14 1. $\frac{3}{4} = \frac{6}{\blacksquare}$ **8** 2. $\frac{2}{3} = \frac{\blacksquare}{9}$ **6** 3. $\frac{6}{12} = \frac{1}{\blacksquare}$ **2**
- N15 4. $\frac{1}{10} = \frac{2}{20} = \frac{\blacksquare}{40}$ **4** 5. $\frac{12}{36} = \frac{\blacksquare}{3}$ **1** 6. $\frac{12}{36} = \frac{2}{\blacksquare}$ **6**
- N16 7. $\frac{2}{5} = \frac{4}{10} = \frac{\blacksquare}{\blacksquare}$ **8 4** 8. $\frac{6}{25} = \frac{\blacksquare}{100} = \frac{\blacksquare}{\blacksquare}$ **24 8 2 4** 9. $\frac{1}{4} = \frac{25}{100} = \frac{\blacksquare}{\blacksquare}$ **25 8 25**

Find the missing number for \blacksquare . Write $<$ or $>$ for \bullet .

- N17 10. $\frac{1}{2} = \frac{\blacksquare}{18}$ **9** 11. $\frac{2}{7} = \frac{\blacksquare}{14}$ **4** 12. $\frac{3}{5} = \frac{\blacksquare}{20}$ **12**
- $\frac{1}{2} \bullet \frac{7}{18}$ $\frac{2}{7} \bullet \frac{3}{14}$ $\frac{3}{5} \bullet \frac{9}{20}$

165

Assigning the Practice

Minimum: 1-5
Average: 1-5
Enriched: 1-5

Review Exercises

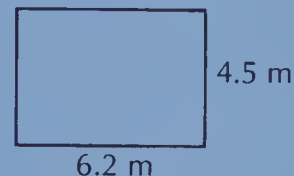
Questions	Objective	Pages
1-3	N14	156-157
4-6	N15	158-159
7-9	N16	160-161
10-12	N17	162-163

Reinforcement

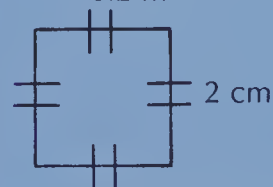
1. Display an advertisement from a food store. Talk about the facts given. Devise three kinds of word problems: too few facts, too many facts, and the proper number of facts. Present these problems orally to the students. Talk about the facts supplied. Have the students add needed facts or remove unnecessary facts and then solve the problems.

2. Find the perimeters and areas of the following rectangles. Rectangles with insufficient information need not be done.

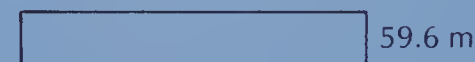
a.



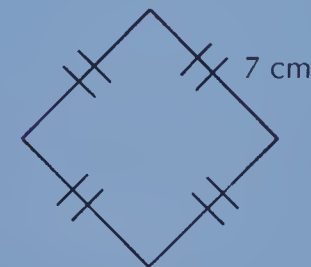
b.



c.



d.



Enrichment

Write the following on the chalkboard. Devise a word problem for each.

- a. $\frac{1}{2}$ and 50 b. 0.4 and 0.2 c. $\frac{1}{5}$ and 30

Problem Solving Activities

Assign Level 5, Unit 7.

Extra Practice

Worksheet PS6

Pages 164-165

Solve the problems that have the necessary facts. If a problem is missing a fact, tell what fact is needed.

How many days does he work in a week?

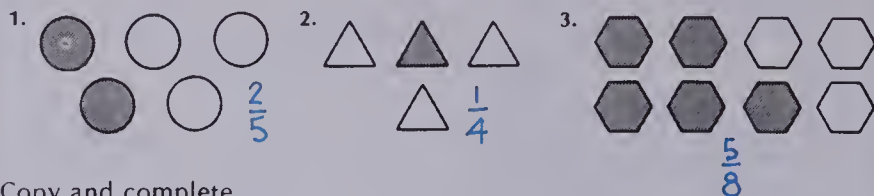
1. Bob works seven hours a day. How many hours does he work in a week?
2. A 1000 mL bottle of shampoo costs \$2.98. How much more shampoo does it have than the smaller bottle? **Capacity of small bottle needed.**
3. Tim gets an allowance of 35¢ a week and Marie gets twice as much. Peter gets 30¢ more than Marie. How much is Peter's allowance? **\$1.00**
4. Mr. Kovak bought six 2 L containers of milk. How much did he pay for the milk? **Cost of 2 L container needed.**
5. A principal ordered 5 buses to take 241 children to the museum. Did he order enough buses? **How many children can ride on each bus?**

Unit 7 Objectives	Test Questions	Pages
N11	1-3	146-147
A34	4-7	148-149
A35	8-9	150-151
N12	10-11	152-153
N13	12-13	154-155
N14	14-17	156-157
N15	18-20	158-159
N16	21-24	160-161
N17	25-28	162-163

TEST

UNIT 7

What fraction of the set is shaded?



Copy and complete.

4. $\frac{1}{5} \times 20 = \blacksquare 4$ 5. $\frac{1}{2} \times 16 = \blacksquare 8$ 6. $\frac{1}{3}$ of 12 = $\blacksquare 4$

7. $\frac{1}{4}$ of 24 = $\blacksquare 6$ 8. $\frac{2}{3} \times 18 = \blacksquare 12$ 9. $\frac{2}{5} \times 10 = \blacksquare 4$

Write the ratio.

10. 6 girls to 10 boys $\frac{6}{10}$ 11. 4 ants to 3 bees $\frac{4}{3}$

Copy and complete.

12. $\frac{3}{4} = \frac{3 \times 4}{4 \times 4} = \blacksquare \frac{12}{16}$ 13. $\frac{21}{35} = \frac{21 \div 7}{35 \div 7} = \blacksquare \frac{3}{5}$

Find the missing term.

14. $\frac{2}{4} = \frac{\blacksquare 1}{2}$ 15. $\frac{1}{5} = \frac{5}{\blacksquare 25}$ 16. $\frac{6}{9} = \frac{2}{3}$ 17. $\frac{\blacksquare 3}{5} = \frac{6}{10}$

Write equivalent fractions.

18. $\frac{4}{5} = \frac{\blacksquare 8}{10} = \frac{\blacksquare 16}{20}$ 19. $\frac{3}{2} = \frac{\blacksquare 9}{6} = \frac{\blacksquare 18}{12}$ 20. $\frac{24}{30} = \frac{\blacksquare 12}{15} = \frac{\blacksquare 4}{5}$

Write as decimals.

21. $\frac{2}{5} = 0.\blacksquare 4$ 22. $\frac{3}{10} = 0.\blacksquare 3$ 23. $\frac{1}{100} = 0.\blacksquare \blacksquare$ 24. $\frac{1}{2} = 0.\blacksquare \blacksquare$

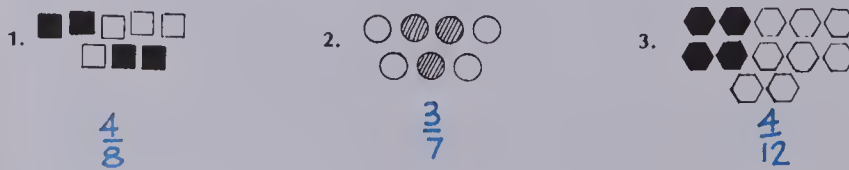
Compare the fractions. Write < or >.

25. $\frac{4}{8} \blacksquare \frac{5}{8}$ 26. $\frac{3}{2} \blacksquare \frac{2}{2}$ 27. $\frac{5}{10} \blacksquare \frac{3}{5}$ 28. $\frac{3}{8} \blacksquare \frac{3}{4}$

Post-test

Unit 7

What fraction of the set is shaded?



Complete.

4. $\frac{1}{3} \times 9 = \underline{3}$ 5. $\frac{1}{4} \times 12 = \underline{3}$ 6. $\frac{1}{5} \times 15 = \underline{3}$

7. $\frac{1}{7} \times 21 = \underline{3}$ 8. $\frac{2}{3} \times 12 = \underline{8}$ 9. $\frac{3}{8} \times 16 = \underline{6}$

Write the ratios.

10. 9 houses to each block $\frac{9}{1}$ 11. 12 cars for 50 people $\frac{12}{50}$

COMPUTATION: X, ÷

Multiply.

1.
$$\begin{array}{r} 570 \\ \times 32 \\ \hline 18\ 240 \end{array}$$

2.
$$\begin{array}{r} 640 \\ \times 27 \\ \hline 17\ 280 \end{array}$$

3.
$$\begin{array}{r} 850 \\ \times 45 \\ \hline 38\ 250 \end{array}$$

4.
$$\begin{array}{r} 790 \\ \times 86 \\ \hline 67\ 940 \end{array}$$

Estimate the product.

5.
$$\begin{array}{r} 603 \\ \times 32 \\ \hline 18\ 000 \end{array}$$

6.
$$\begin{array}{r} 795 \\ \times 41 \\ \hline 32\ 000 \end{array}$$

7.
$$\begin{array}{r} 806 \\ \times 69 \\ \hline 56\ 000 \end{array}$$

8.
$$\begin{array}{r} 598 \\ \times 89 \\ \hline 54\ 000 \end{array}$$

Multiply.

9.
$$\begin{array}{r} 364 \\ \times 73 \\ \hline 26\ 572 \end{array}$$

10.
$$\begin{array}{r} 508 \\ \times 46 \\ \hline 23\ 368 \end{array}$$

11.
$$\begin{array}{r} 273 \\ \times 58 \\ \hline 15\ 834 \end{array}$$

12.
$$\begin{array}{r} 702 \\ \times 67 \\ \hline 47\ 034 \end{array}$$

13.
$$\begin{array}{r} \$6.17 \\ \times 25 \\ \hline \$154.25 \end{array}$$

14.
$$\begin{array}{r} \$8.95 \\ \times 82 \\ \hline \$733.90 \end{array}$$

15.
$$\begin{array}{r} \$1.48 \\ \times 37 \\ \hline \$54.76 \end{array}$$

16.
$$\begin{array}{r} \$7.09 \\ \times 86 \\ \hline \$609.74 \end{array}$$

Divide.

17.
$$\begin{array}{r} 8R6 \\ 17 \overline{)142} \end{array}$$

18.
$$\begin{array}{r} 6R36 \\ 51 \overline{)342} \end{array}$$

19.
$$\begin{array}{r} 7R9 \\ 22 \overline{)163} \end{array}$$

20.
$$\begin{array}{r} 5R63 \\ 75 \overline{)438} \end{array}$$

21.
$$\begin{array}{r} 6R31 \\ 35 \overline{)241} \end{array}$$

22.
$$\begin{array}{r} 7R12 \\ 42 \overline{)306} \end{array}$$

23.
$$\begin{array}{r} 7R11 \\ 16 \overline{)123} \end{array}$$

24.
$$\begin{array}{r} 4R26 \\ 74 \overline{)322} \end{array}$$

25.
$$\begin{array}{r} 57 \\ 10 \overline{)570} \end{array}$$

26.
$$\begin{array}{r} 88 \\ 30 \overline{)2640} \end{array}$$

27.
$$\begin{array}{r} 24 \\ 80 \overline{)1920} \end{array}$$

28.
$$\begin{array}{r} 59R60 \\ 70 \overline{)4190} \end{array}$$

29.
$$\begin{array}{r} 38R10 \\ 48 \overline{)1834} \end{array}$$

30.
$$\begin{array}{r} 75R25 \\ 62 \overline{)4675} \end{array}$$

31.
$$\begin{array}{r} 13R2 \\ 91 \overline{)1185} \end{array}$$

32.
$$\begin{array}{r} 73R2 \\ 26 \overline{)1900} \end{array}$$

33.
$$\begin{array}{r} 59R4 \\ 59 \overline{)3485} \end{array}$$

34.
$$\begin{array}{r} 38 \\ 83 \overline{)3154} \end{array}$$

35.
$$\begin{array}{r} 43R10 \\ 35 \overline{)1515} \end{array}$$

36.
$$\begin{array}{r} 18R21 \\ 78 \overline{)1425} \end{array}$$

Solve.

37. Joan's building has 840 apartments in all. There are 42 apartments on each floor and 2 elevators. How many floors of apartments are in the building? 20

Complete.

12. $\frac{5}{8} = \frac{5 \times 3}{8 \times 3} = \frac{15}{24}$

13. $\frac{12}{16} = \frac{12 \div 4}{16 \div 4} = \frac{3}{4}$

14. $\frac{4}{8} = \frac{\blacksquare 1}{2}$

15. $\frac{1}{3} = \frac{3}{\blacksquare 9}$

16. $\frac{15}{\blacksquare 20} = \frac{3}{4}$

17. $\frac{\blacksquare 2}{3} = \frac{12}{18}$

18. $\frac{2}{3} = \frac{\blacksquare 6}{9} = \frac{\blacksquare 8}{12}$

19. $\frac{5}{2} = \frac{\blacksquare 10}{4} = \frac{\blacksquare 25}{10}$

20. $\frac{20}{24} = \frac{\blacksquare 10}{12} = \frac{\blacksquare 5}{6}$

Write as decimals.

21. $\frac{3}{5} = 0.\underline{6}$

22. $\frac{9}{10} = 0.\underline{9}$

23. $\frac{7}{100} = 0.\underline{07}$

24. $\frac{1}{20} = 0.\underline{05}$

Compare the fractions. Write < or >.

25. $\frac{7}{10} \text{ (} < \text{) } \frac{8}{10}$

26. $\frac{4}{5} \text{ (} < \text{) } \frac{5}{5}$

27. $\frac{4}{7} \text{ (} > \text{) } \frac{7}{14}$

28. $\frac{2}{3} \text{ (} > \text{) } \frac{7}{12}$

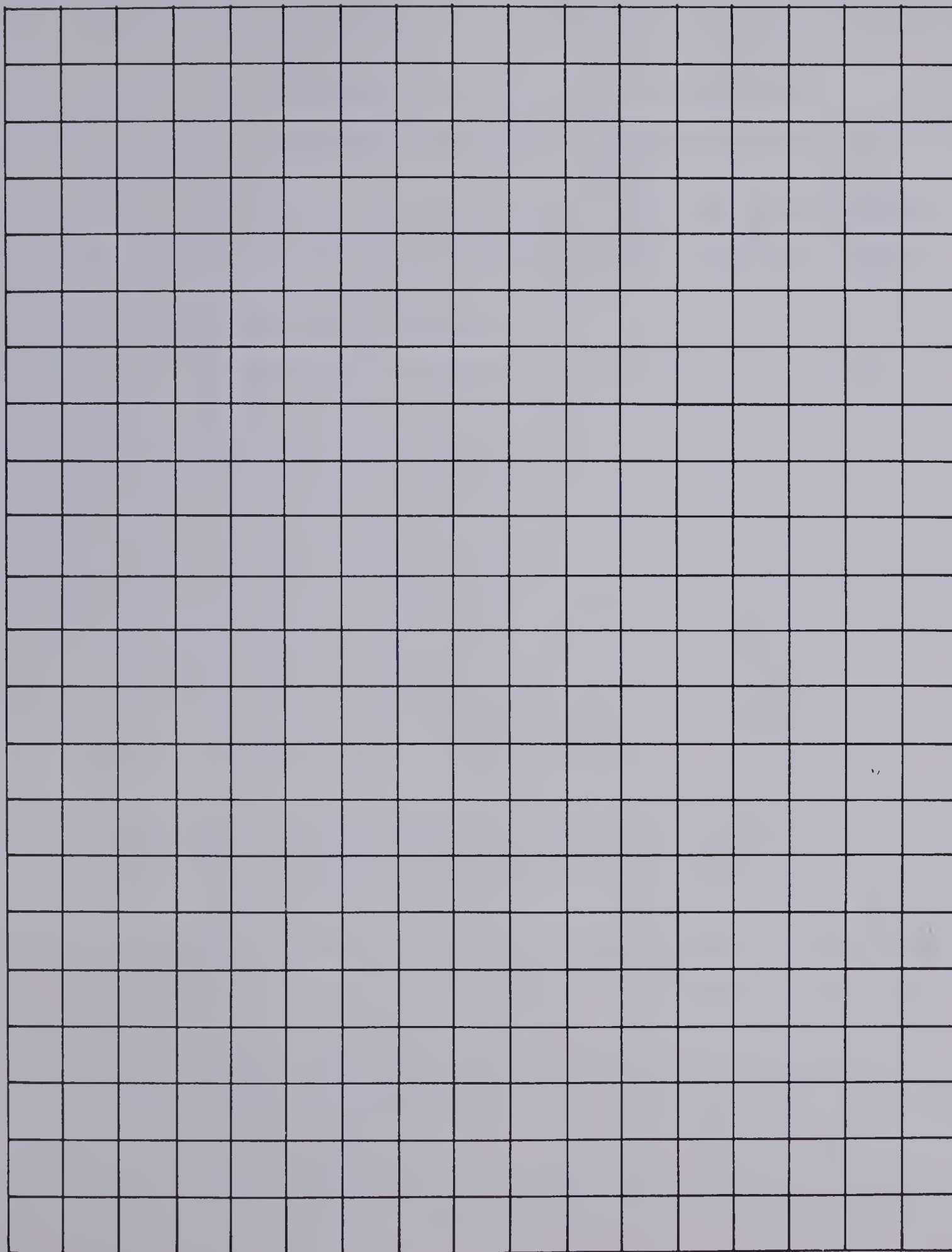
UNIT 8

Graphs

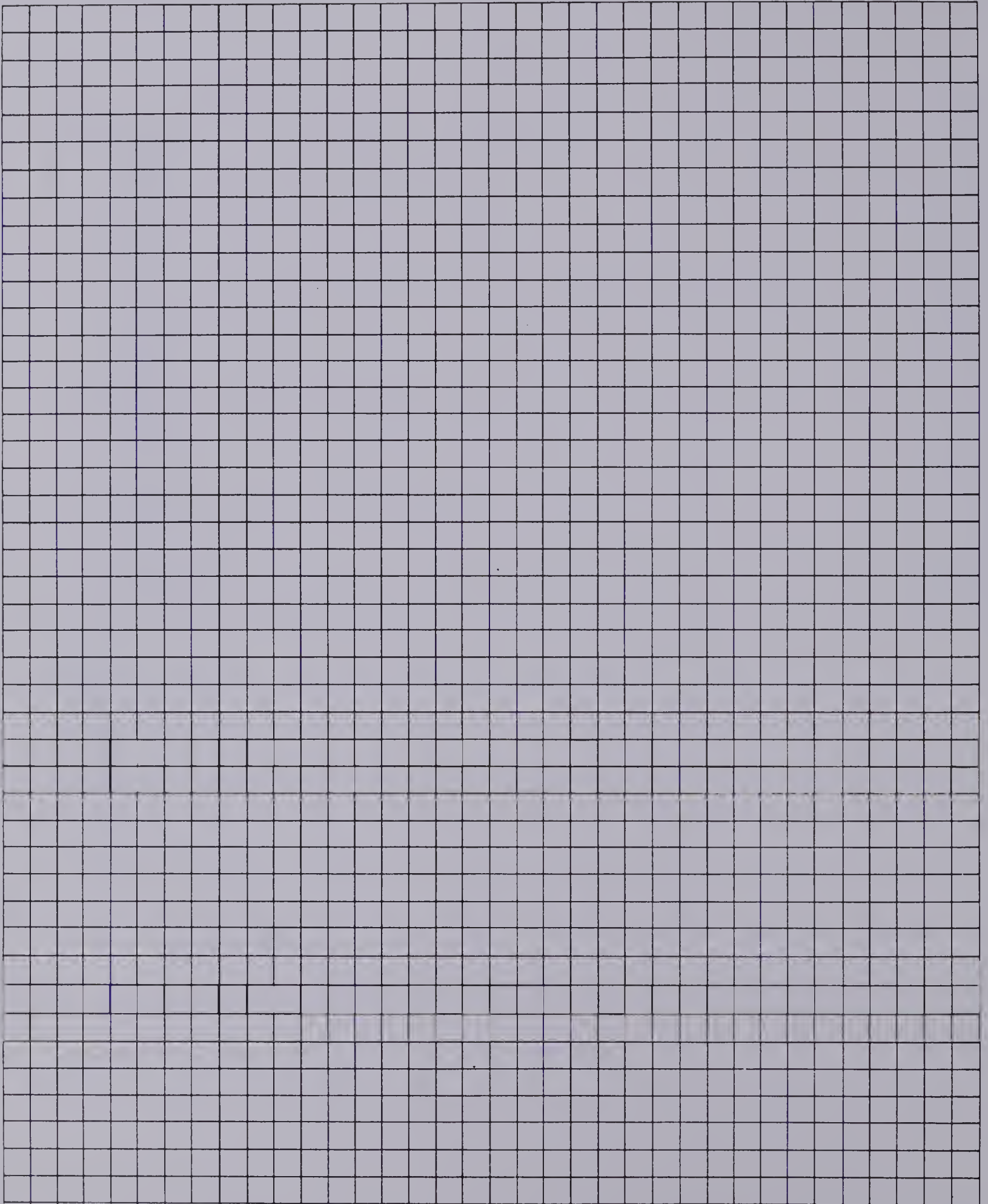
Theme: Trees

Lesson		Objective	Pages
Preview		Multiply by 2, 5, 10, 50, 100, and 500.	169
1	GR 1	Interpret and make pictographs.	170-171
2	GR 2	Interpret and make bar graphs.	172-173
3	GR 3	Interpret and draw line graphs.	174-175
4	GR 4	Understand the meaning and usefulness of coordinates or ordered pairs.	176-177
5	GR 5	Locate points on a grid for given coordinates and write the coordinates of given grid points.	178-179
6	GR 6	Find the second coordinate of an ordered pair, given the first coordinate and the rule for the ordered pair.	180-181
7	GR 7	Locate places on a map using coordinates.	182-183
8	M14	Find the radius, diameter, and circumference of a circle.	184-185
9	GR 8	Interpret and make circle graphs.	186-187
10	PS7	Solve problems involving the reading and interpretation of graphs.	188-189
Test		Graphs	190
Review		Fractions and ratios	191

1 cm grid



5 mm grid



About This Unit

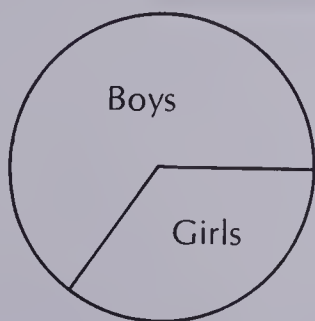
The aim of this unit is to:

1. develop skill in interpreting and making pictographs, bar graphs, line graphs, and circle graphs.
2. develop skill in using a coordinate graphing system.
3. develop skill in measuring the radius, diameter, and circumference of a circle.

The work of the unit involves the application of previously learned computational skills. It provides an excellent opportunity for the integration of mathematical skills with science and social studies. The theme of the unit, *Trees*, which is brought out in nearly every lesson, makes this integration with other subject areas easier.

Each lesson in this unit begins with simple, concrete examples of the concepts of the lesson. For example, Lesson 9 introduces the use of circle graphs to represent information. Two boys and one girl are asked to come to the front of the room. The teacher asks, "What fraction of these students are boys? What fraction are girls?" (This skill has already been developed in Unit 7.) Then the teacher explains that this information can be represented on a circle graph. A circle is drawn on the chalkboard and the students determine how to partition it so that $\frac{1}{3}$ of it represents the girls and $\frac{2}{3}$ of it represents the boys.

Students in the Front of the Room



This kind of simplified activity is then followed by a discussion of the lesson example in the book.

Upon completion of this unit, students should appreciate the value of graphing as it makes sets of statistical information clearer. Therefore, it is a valuable tool in decision making and problem solving.

Ideas

Prepare and develop as many graphs as possible that represent information about the students and their school activities. Keep these graphs on display in the classroom. These might include:

- a. a line graph of the number of students absent each day.
- b. a bar graph of the number of students who viewed a certain TV program.
- c. a circle graph of the eye colours of the students.
- d. a pictograph of the number of metres run by several students.
- e. a bar graph of the number of correct answers on daily arithmetic fact quizzes.

UNIT 8

GRAPHS



Unit 8 Objective	Test Questions	Pages
GR 1	1	170-171
GR 2	2	172-173
GR 3	3-4	174-175
GR 4,5	5-9	176-179
GR 6	10-11	180-181
GR 7	12-17	182-183
GR 8	18-19	186-187

Pretest

Unit 8

- How many plants of each kind are there?

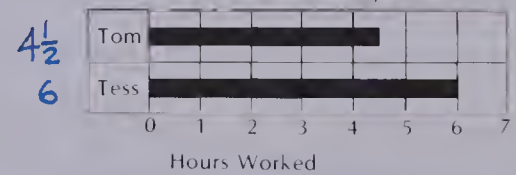
Plants in our Garden

Marigolds	● ● ●	12
Begonias	● ● ● ● ●	18

● = 4 plants

- How long did each student work?

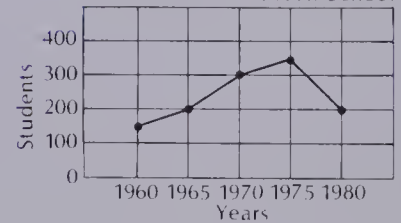
Hours of Work on Project



- When was the enrollment the greatest? the lowest?
- Between what years was the enrollment increasing?

1975 1960
1960-1975

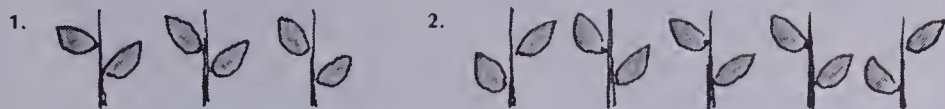
Enrollment at Goodson School



Forest Multiplication

Write a multiplication equation for each picture.

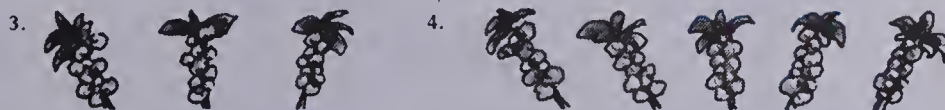
Two leaves on each stem. How many leaves?



$$3 \times 2 = 6$$

$$5 \times 2 = 10$$

Ten flowers on each stem. How many flowers?



$$3 \times 10 = 30$$

$$5 \times 10 = 50$$

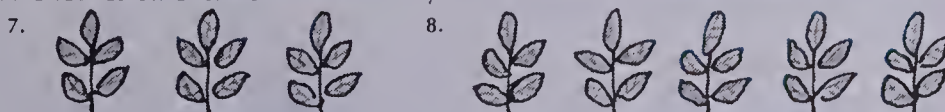
One hundred fruit trees in each row. How many trees?



$$3 \times 100 = 300$$

$$5 \times 100 = 500$$

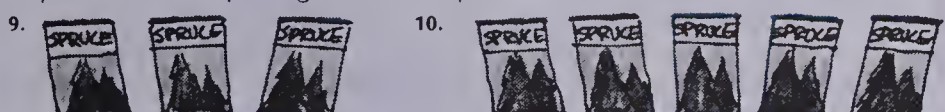
Fifty leaves on each stem. How many leaves?



$$3 \times 50 = 150$$

$$5 \times 50 = 250$$

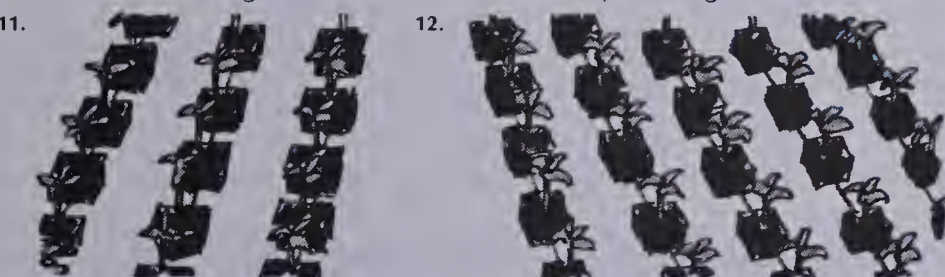
Fifty seeds in each package. How many seeds?



$$3 \times 50 = 150$$

$$5 \times 50 = 250$$

Five hundred seedling trees in each row. How many seedling trees?



$$3 \times 500 = 1500$$

$$5 \times 500 = 2500$$

UNIT 8

PREVIEW

Suggestions

Talk about the kinds of trees common in your area, especially those in view from your classroom window. Discuss the identifying characteristics of the trees. Display pictures of different varieties of trees in the classroom so that the students will become familiar with them.

About the Page

Page 169 provides a review of counting and multiplying by 2, 10, 100, 5, 50, and 500. This skill is important in generating the coordinate intervals of graphs.

Show the students how the amounts of items pictured on page 169 can be found by skip counting or by multiplying. Explain how the multiplication equations can be generated.



Three 2s

$$3 \times 2 = 6$$

Have the students also name the related multiplication equation for each.

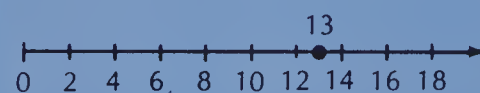
$$5 \times 50 = 250$$

$$50 \times 5 = 250$$

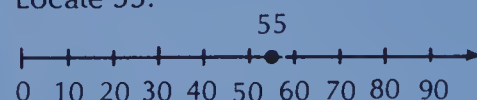
Reinforcement

Give each student a worksheet of number lines. Have them label the intervals on the number lines as they count by 2s, 10s, 100s, 5s, 50s, and 500s. Then ask them to locate the points on the number lines where various numbers can be found. For example:

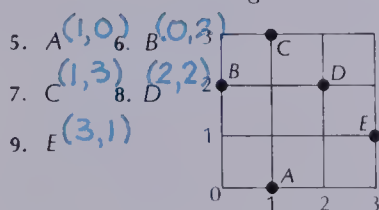
a. Locate 13.



b. Locate 55.



Write the coordinates describing each location on the grid



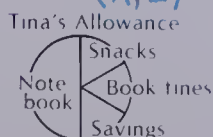
Who lives at each location?

12. (B, 3) Kim 13. (C, 4) Sally 14. (D, 2) Rose

Write an ordered pair for each

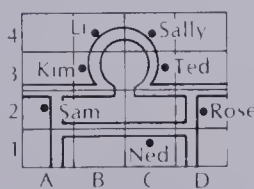
15. Sam's house (A, 2) 16. Li's house (B, 4)

17. Ned's house (C, 1)



18. How was most of Tina's allowance spent? Note book

19. What fraction of her allowance did she save? 1/6



UNIT 8 LESSON 1

Objective GR1

Interpret and make pictographs.

Introducing the Lesson

Place a jar filled with dried beans in view of the class. Ask three students to reach in the jar for a handful of beans and then to count the amount of beans they took.

Teaching the Lesson

Explain to the class that you are going to make a **pictograph** of the amounts of beans taken by each student. Point out that this kind of graph uses pictures to represent information.

List the three students' names on a large sheet of chart paper. Choose stickers to represent the amounts of beans taken. Point out the impracticality of placing one sticker on the chart for each bean taken. Have the students decide how many beans each sticker should represent. Let the students suggest how a chart similar to the following is completed. Talk about how uneven amounts of beans can be represented by half stickers.

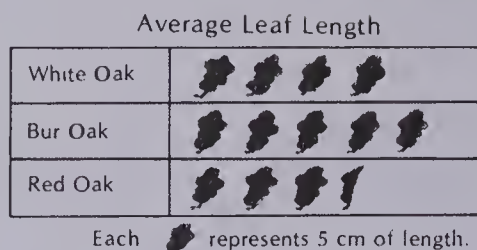
Tom	● ● ● ● ●
Ann	● ● ●
Joe	● ● ● ● ● ● ● ●

Each ● represents 4 beans.



Look at the pictograph on page 170 which gives information about the lengths of various kinds of oak leaves. Let the students identify all the information represented in the graph. Point out how important the title and key of the graph are.

Have the students look at the pictograph on page 171 which gives information about the lengths of various kinds of maple leaves. After they have identified the information represented in the graph, have them compare leaf lengths of oaks and maples.









Pictographs




EXERCISES

1. What does  represent? **5 cm**
2. What is the average length of the White Oak leaf? **20 cm**
3. What does  represent? **2.5 cm**
4. What is the average length of the Red Oak leaf? **17.5 cm**
5. What is the difference in average lengths of Bur Oak and White Oak leaves? **5 cm**

Pine Needles in a Cluster

Lodgepole	 
White	  
Jack	
Ponderosa	 

Each  represents two needles.



6. Which pine tree has the largest number of needles growing in a cluster? **White pine**
7. Which pine trees have the same number of needles growing in a cluster? **Lodgepole and Jack**
8. How many needles grow in one cluster on the Ponderosa Pine? **3**

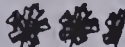




170


Using the Exercises

- Discuss the information about pine needles represented in the pictograph. Show a library book about the characteristics of pine trees to verify the information in the pictograph.
- Questions 1 to 8 can be done orally with discussion before the students do them independently.



PRACTICE

Average Leaf Width

Sugar Maple	
Red Maple	
Silver Maple	
Striped Maple	
Bigleaf Maple	

















Each  represents 4 cm in width.



- What does  represent? **4 cm**
- What is the average width of the Red Maple leaf? **12 cm**
- What is the average width of the Bigleaf Maple leaf? **28 cm**
- What does  represent? **2 cm**
- What is the average width of the Sugar Maple leaf? **10 cm**
- What is the difference in average widths of Silver Maple and Striped Maple leaves? **2 cm**
- Which leaf is the largest? **Bigleaf**

Heads and Feet

A group of boys and dogs were playing at a park. There were 22 heads and 72 feet in the group. Draw a picture graph showing the number of boys and the number of dogs at the park.

Boys	       
Dogs	              

171

Assigning the Practice












Minimum: 1-7
Average: 1-7
Enriched: 1-7

Reinforcement

1. Have several students collect bottle caps. Then have them make a pictograph to represent the amount of bottle caps each student has collected. Let the students decide what picture to use and how many bottle caps each picture will represent on the graph.

2. Have the students use the statistics from a baseball, basketball, or hockey game reported in the newspaper to make a pictograph. For example:

Shots on Goal

Canadiens	     
Maple Leafs	    

 represents 5 shots on goal.

Enrichment



1. Assign *Heads and Feet* at the bottom of page 171.

2. Make a bulletin board display of pictographs from current magazines or newspapers.










Extra Practice


Worksheet GR1

Pages 170-171

- Draw a pictograph to show the number of boys and girls in your class. Use  to represent 2 boys and  to represent 2 girls.
- Draw a pictograph to show this information.
Money Earned at the Walkathon: Paul \$12.00, Sandra, \$20.00, Li \$22.00, Nick \$26.00. Use a picture of a dollar bill to represent four dollars.
- Use the pictograph to answer these questions.
 - How many fiction books are in the library? **1000**
 - How many non-fiction books are there? **1250**
 - How would 125 books be represented? **E**

Books in Holden School Library

Fiction	   
Non-fiction	    

 represents 250 books

Objective GR2

Interpret and make bar graphs.

Introducing the Lesson

Measure the height in centimetres of each of five students. List the heights on the chalkboard. Discuss how a pictograph could be made to represent the information. Point out that another kind of graph, called a **bar graph**, can more precisely represent this sort of information.

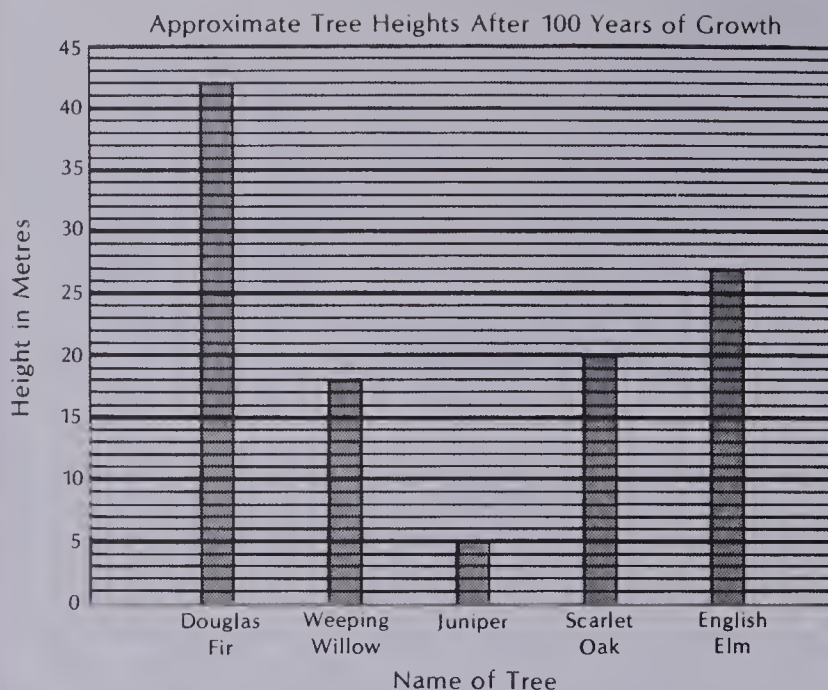
Teaching the Lesson

Make a bar graph of the students' heights on an overhead projector. Discuss how intervals of 10 can be used on the height axis. Point out the importance of the graph title and the titles for the two axes. Show how each height can be precisely represented with a bar.

Look at the bar graph of tree heights on page 172. Point out the graph title and the labels for the axes. Discuss the use of intervals of 5 for precise representation. Have the students interpret the information.

Point out the bar graph of the diameters of tree trunks on page 173. Explain the meaning of diameter. Discuss the graph title and axes labels. Ask why intervals of 20 were used on the diameter axis. Note that the bars on these kinds of graphs can be either vertical or horizontal. Have the students interpret the information.

Measure in centimetres the armspans of 5 students. Make a horizontal bar graph of the information with the class. Discuss the kinds of intervals that would be best for the armspan axis. Let the students suggest the appropriate graph title and axes labels.

Bar Graphs**EXERCISES**

Use the bar graph to answer these questions.

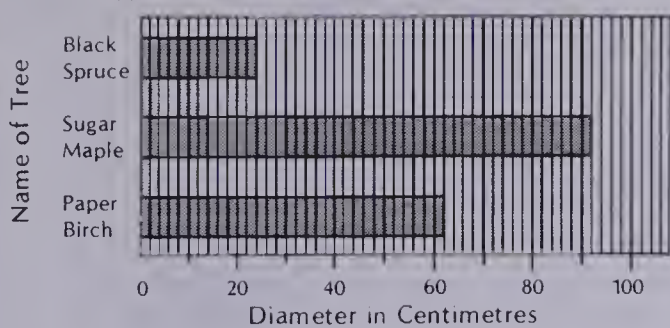
1. How many different kinds of trees are represented in the graph? **5**
2. What unit of measure is used to report tree height? **metres**
3. Which of the trees is the smallest? **Juniper**
4. What is the height of the Douglas Fir after 100 years of growth? **42 m**
5. Which tree grows to over twice the size of the Scarlet Oak? **Douglas Fir**
6. What is the height of the English Elm after 100 years of growth? **27 m**

Using the Exercises

- Show pictures from a library book of the five trees represented in the bar graph. The lesson discussion of the graph should enable the students to answer questions 1 to 6 on their own without difficulty.

PRACTICE

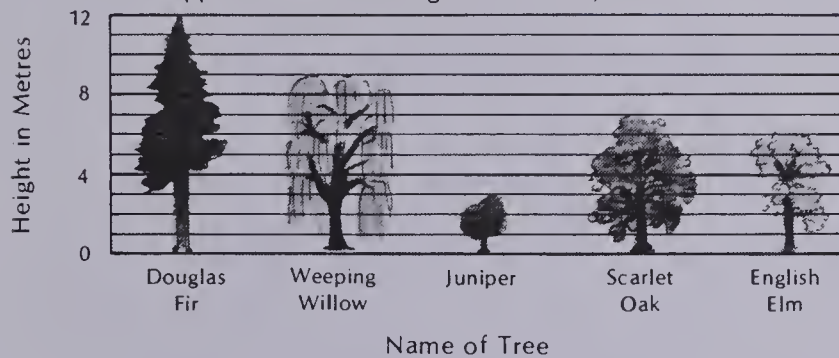
Approximate Diameters of Tree Trunks After 100 Years Growth



- What unit of measure is used to report tree trunk diameter? **centimetres**
- What is the Black Spruce's trunk diameter after 100 years? **24 cm**
- Which tree has the largest trunk diameter when fully grown? **Sugar Maple**
- What is the difference in trunk diameters between the Paper Birch and the Sugar Maple? **30 cm**

A Picture Graph

Approximate Tree Heights After 15 years of Growth



- What unit of measure is used to report tree height? **metres**
- Which tree grows the tallest during the first 15 years? **Douglas Fir**
- What is the height of the Scarlet Oak after 15 years? **7 m**
- After 15 years, how much taller than the Elm is the Willow? **3 m**

173

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Reinforcement

1. Take the class to the gym. Divide them into activity groups of four or five students. Have each student in a group do the activity and record the number of times it was done without a miss. Activities might include:

- tapping a volleyball in the air
- bouncing a basketball on the ground
- skipping rope.

Return to the classroom and have each group make a bar graph of the performance of its activity. Display the results.

2. Make a bar graph of these approximate tree heights after 100 years of growth.

- northern red oak 18 m
- butternut 16 m
- northern white cedar 13 m
- mountain ash 7 m
- pin cherry 5 m

3. Keep a bar graph record of weekly spelling test scores.

Enrichment

1. Assign *A Picture Graph* at the bottom of page 173. Explain the difference between a **pictograph**, in which one symbol represents more than one item (e.g., one leaf represents 5 cm), and a **picture graph**, in which single pictures of the items are used.

2. Collect, display, and discuss bar graphs from magazines and newspapers.

Extra Practice

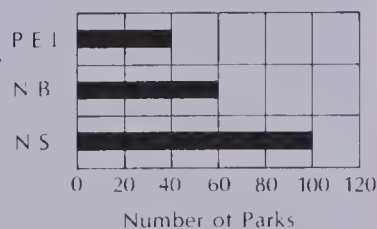
- Use the graph to answer these questions

- Which of the three provinces has the greatest number of provincial parks? **N.S.**
- How many parks has Prince Edward Island? Nova Scotia? **40** **100**
- Do New Brunswick and Prince Edward Island together have as many parks as Nova Scotia? **Yes**

Worksheet GR2

Pages 172-173

Provincial Parks



- Make a bar graph to show the approximate area in square kilometres of these islands: Vancouver 31 000 km², Graham 6000 km², Banks 1000 km², Moresby 2500 km²

Objective GR3

Interpret and draw line graphs.

Introducing the Lesson

Collect information from the local newspapers on the high temperatures for your area each day for the last week. List the information on the chalkboard. Talk about making a suitable graph of the temperatures. Discuss the impracticality of a pictograph or a bar graph. Point out that a **line graph** is most commonly used to indicate growth, or rises and falls.

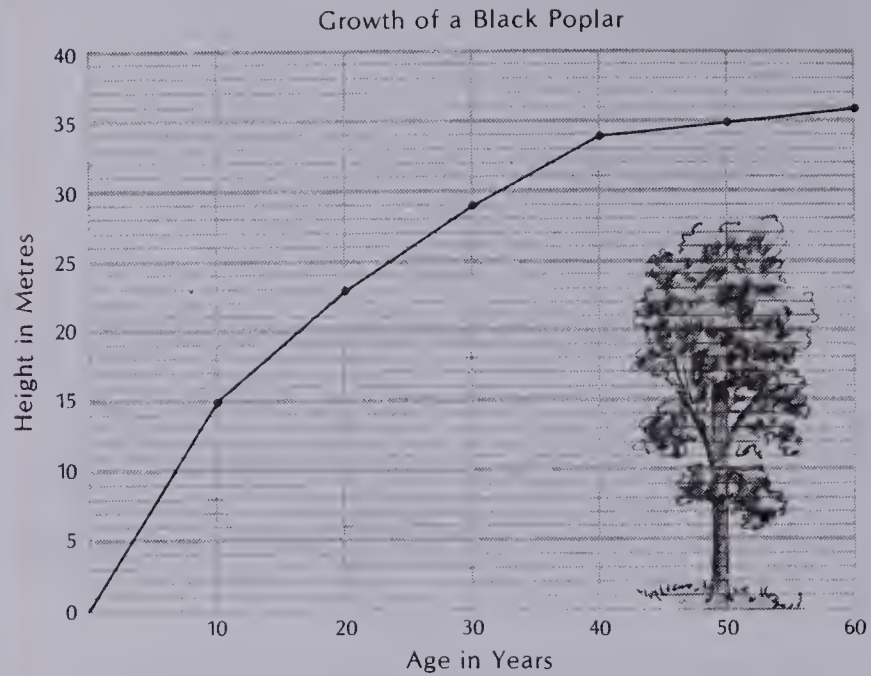
Teaching the Lesson

Make a line graph of daily temperatures on an overhead projector. Discuss the graph title and the labels for the axes. Let the students help you decide on the intervals to use on the temperature axis. Show how points are marked to indicate the high temperatures each day and then straight lines are drawn to connect the points to indicate the rise and fall of the temperature.

Discuss the line graph of the growth of the black poplar tree on the top of page 174. Note the title and the labels on the axes. Discuss the information represented in the graph. Note that if data were available for the height of the tree every two years, the graph would be more accurate than the one shown. (The line graph is the most commonly misused graph. The information given in a line graph should have meaning between the marked points as well as at the marked points.)

Also discuss the line graph of the growth of the balsam fir tree at the top of page 175. Compare its growth to that of the black poplar.

Line Graphs



EXERCISES

Use the line graph to answer these questions.

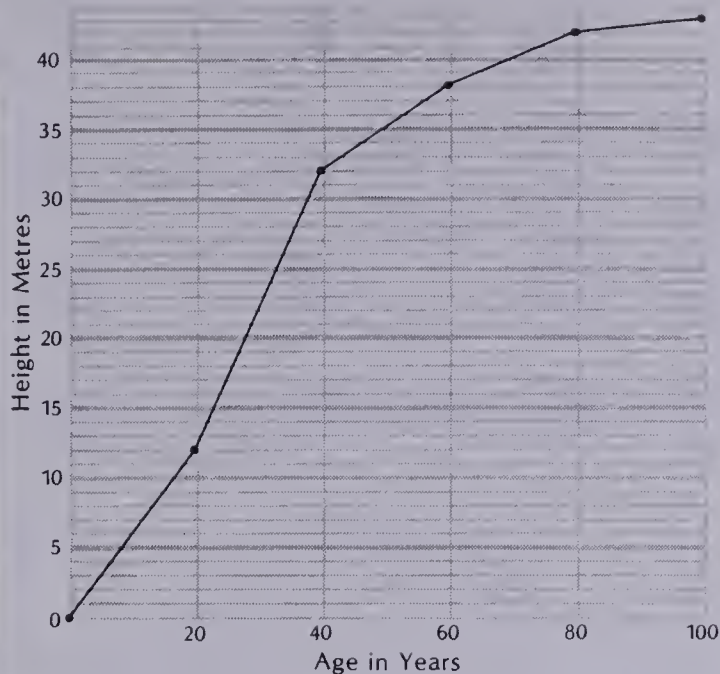
- What unit of measure is used to report the height? **metres**
- How often is the tree's height reported? **Every 10 years**
- What is the height of the tree after 10 years? **15 m**
- What is the height of the tree after 50 years? **35 m**
- During what 10 year period does the tree grow the most? **The First**
- At what age does the growth seem to level off? **40 years**
- Approximately how many metres does the tree grow between 20 and 30 years? **6 m**
- Approximately how many metres does the tree grow between 10 and 40 years? **19 m**

Using the Exercises

- Questions 1 to 8 test the students' ability to interpret information given on a line graph. Since the graph was discussed during the lesson, the students should be able to answer the questions independently. Check student responses orally and give additional help to any students who are experiencing difficulties.

PRACTICE

Growth of a Balsam Fir Tree



- How often is the tree's height reported? **Every 20 years**
- What is the height of the tree after 40 years? **32 m**
- What is the height of the tree after 100 years? **43 m**
- During what 20 year period does the tree grow the most? **20-40**
- Approximately how many metres does the tree grow between 20 and 40 years? **20 m**

Scotch Pines

With graph paper, make a line graph to show the growth of a Scotch Pine tree.

Age in Years	0	10	20	30	40	50	60
Height in Metres	0	5	10	14	18	21	24

175

Assigning the Practice

Minimum: 1-5

Average: 1-5

Enriched: 1-5

Reinforcement

1. Assign *Scotch Pines* at the bottom of page 175.

2. On a sunny day, have the students find the length of their shadows every hour. Each student draws a line graph to show his or her results.

3. Give each student a bean seed to sprout in the classroom. Have them measure the height of the sprouts each day until they are full grown. Then the students are to make a line graph to show the bean plants' growth.

Enrichment

1. Ask the students to research the average high and low temperatures for each month in their area. Have them make a line graph of their findings on the bulletin board. Tacks and coloured string can be used for the points and the lines. Two lines will be needed, one for the high and one for the low temperatures.

2. Have the students research the populations of Canada's four largest cities at ten-year intervals since 1900 and then represent this information in a line graph. Four lines will be needed on the graph, one for each city.

Extra Practice

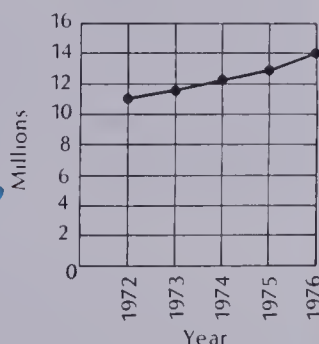
1. Use the graph to answer these questions.

- What unit of measure is used on the vertical axis? **Millions**
- About how many telephones were there in 1972? In 1976?
10 500 000 14 000 000
- About how many more telephones were there in 1976 than there were in 1972? **3 500 000**

Worksheet GR3

Pages 174-175

Telephones in Use in Canada



- Draw a line graph to show the average daily temperature for Frobisher Bay in the summer: June 4°C, July 8°C, August 7°C, and September 2°C.

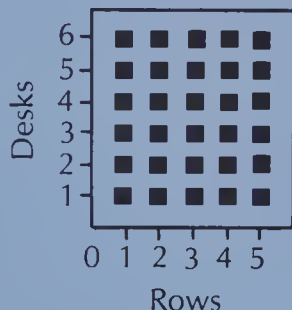
Objective GR4

Understand the meaning and usefulness of coordinates or ordered pairs.

Introducing the Lesson

Ask students how they remember the position of their desks at the beginning of each school year. Generally, objects are located by noting the distance across and the distance up or down from some reference point.

Draw a grid on the chalkboard representing the rows and desks of your classroom. Discuss how easy it is to locate a desk with the grid. Let the students discover that two points of reference (numbers or letters) are needed to locate an item. Stress that with graphs or grids in mathematics, by convention, we name the horizontal distance first and the vertical distance second. Have the students give the location of their desks, e.g., Row 3, Desk 5.

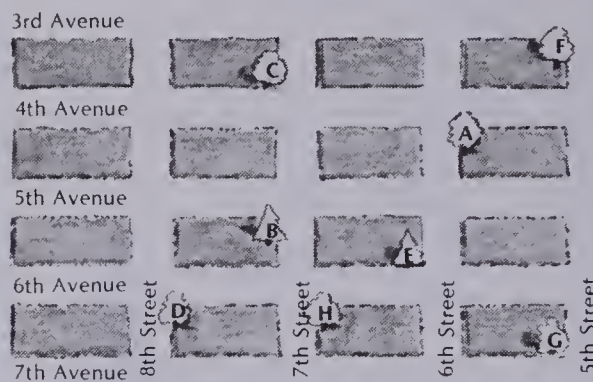


Teaching the Lesson

Use the map in the lesson example on page 176 to illustrate the coordinate system of streets and avenues that is used to locate places. Be sure the students use the convention of naming the street first. Give students various locations, such as the corner of 6th Street and 4th Avenue or the corner of 7th Street and 6th Avenue. Have them point to these locations on a map similar to the one on page 176 that you have drawn on the chalkboard. (Make sure that the students realize that the named locations in this lesson are points where streets and avenues intersect (cross), or where horizontal and vertical lines intersect, so that this lesson serves as a building block for the next lesson on ordered pairs and the coordinate axes. Lesson 7 will deal later with map grids where the coordinates refer to the regions between the horizontal and vertical lines.

Coordinates

Lettered trees show the locations of the different kinds of trees.



C is the Birch tree.

The **coordinates**, or **ordered pair**, describing its location are:

(7th Street, 4th Avenue).

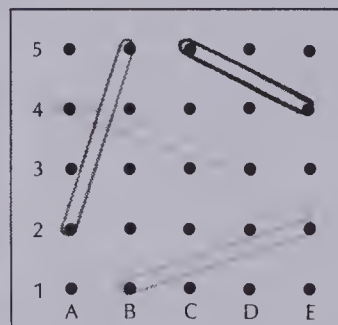
Name the coordinate for the street *first*.

Then name the coordinate for the avenue.

EXERCISES

Write the coordinates describing the location of the tree.

1. Poplar (A) (6th St., 4th Ave.)
2. Fir (B) (7th St., 5th Ave.)
3. Oak (D) (8th St., 6th Ave.)
4. Spruce (E) (6th St., 6th Ave.)
5. Aspen (F) (5th St., 3rd Ave.)
6. Ash (G) (5th St., 7th Ave.)
7. The coordinates for the Juniper are (7th Street, 6th Avenue).
What letter do you find at this location? **H**



Each elastic is around two pegs.

Name the coordinates for each peg, giving the letter first.

8. red elastic: (A, 2) and (B, 5)
9. blue elastic: (C, 5) and (D, 3)
10. black elastic: (C, 5) and (E, 4)
11. green elastic: (B, 1) and (E, 2)

Using the Exercises

- Questions 1 to 7 require the students to name specific coordinates on the streets and avenues grid of the lesson example. Do a few examples together.
- Questions 8 to 11 require the students to name coordinates on the grid for the pegs and elastics. Do a few examples together to see that the students record each ordered pair properly, naming the horizontal coordinate first.

PRACTICE



Name the tree at each location.

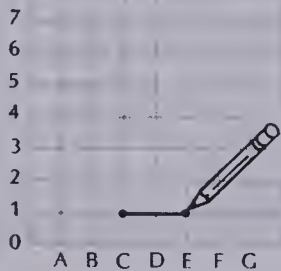
1. (B, 2) **Oak** 2. (D, 4) **Linden** 3. (A, 1) **Maple**
 4. (C, 3) **Spruce** 5. (D, 1) **Aspen** 6. (B, 4) **Hemlock**

Write the coordinates describing the location of these trees.

7. Dogwood **(A, 3)** 8. Cherry **(D, 2)** 9. Ash **(D, 3)**
 10. Hickory **(B, 1)** 11. Elm **(C, 1)** 12. Cedar **(C, 4)**

Coordinate Mystery

Letter and number a grid on graph paper as shown. Make a dot for each ordered pair. Join the dots in order with a straight line.



1. (C, 1) 2. (E, 1) 3. (E, 2)
 4. (G, 2) 5. (F, 3) 6. (G, 3)
 7. (E, 5) 8. (F, 5) 9. (D, 7)
 10. (B, 5) 11. (C, 5) 12. (A, 3)
 13. (B, 3) 14. (A, 2) 15. (C, 2)
 16. (C, 1)

177

Assigning the Practice

Minimum: 1-12

Average: 1-12

Enriched: 1-12

Reinforcement

1. Play "Streets and Avenues" in the gymnasium or outside. The students line up in several rows and stretch out their arms. When a caller shouts "Streets", they face the front; when the caller shouts "Avenues", they face the side. A chaser ("It") tries to catch a runner as he or she runs through the lanes. The caller tries to help the runner by calling either "Streets" or "Avenues" to change the open paths by having the students face a different direction.

2. Have the students make a grid for the rows and desks of the classroom (as was done in the lesson on the chalkboard). Then ask them to write five students' names and write the ordered pair that describes the locations of their desks.

3. Write ordered pairs for each students' desk location (Row 4, Desk 3) on cards and play "Mystery Student". Students, in turn, take a card and name the student at the location designated by the ordered pair.

Enrichment

1. Assign *Coordinate Mystery* at the bottom of page 177. Suitable graph paper is provided with this *Teacher's Resource Book*.

2. Have the students use a map in an atlas showing latitude and longitude. Name several places that are given in the index and have the students locate the places using latitude and longitude.

Extra Practice

Use the grid to write words from the coordinates.

1. (D, 3) (B, 3) (A, 4) (C, 3)
 2. (A, 2) (D, 1) (C, 1) (D, 2) (B, 1)
 3. (B, 1) (A, 3) (A, 2) (C, 1) (C, 3) (B, 1)
 4. (C, 2) (C, 3) (A, 3) (D, 4)

Worksheet GR4

Pages 176-177

4	B	D	M	P
3	A	U	E	C
2	R	Y	L	H
1	V	T	G	I
	A	B	C	D

5. Make other words from the letters in the square. "Spell" the words by writing the coordinates of each letter in order. Letters may be used more than once in a word.

Objective GR5

Locate points on a grid for given coordinates and write the coordinates of given grid points.

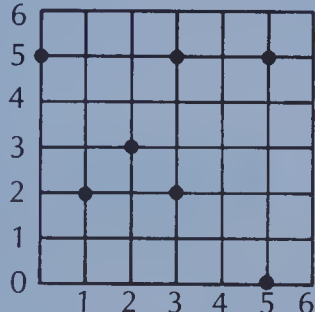
Introducing the Lesson

Recall how desks were located in the classroom by using rows and desk numbers in the previous lesson. Note that in locating a desk the row was mentioned first. Explain that the coordinates — Row 2, Desk 4 — have a certain order. Hence, they are called an **ordered pair**. Point out that ordered pairs locate points by referring to *horizontal distance* (across) first and then to *vertical distance* (up).

Write a few ordered pairs on the chalkboard. For each, have the students practise saying, for example, (4,2) Across 4, up 2.

Teaching the Lesson

Draw the following grid on the chalkboard. Plot several points on the grid and have the students name the ordered pairs for the points. At first they may say, e.g., across 5, up 5; then (5, 5).



See that the students do not confuse the coordinates for (0, 5) and (5, 0) or (3, 2) and (2, 3).

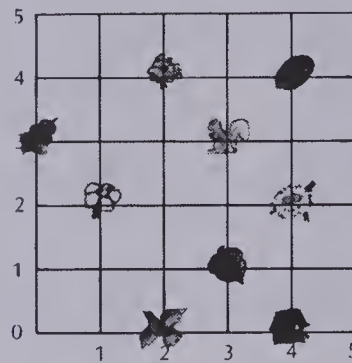
Point out the example at the top of page 178. Name a few of the objects illustrated and ask the students to give the coordinates for their locations. Then name coordinates and have the students name the object identified.

Coordinates

An ordered pair describes the location of a point on a grid.

The order of the pair must be:

(units **across**, units **up**)



The coordinates describing the location of the birdhouse are: (across 4, up 0) or (4, 0).

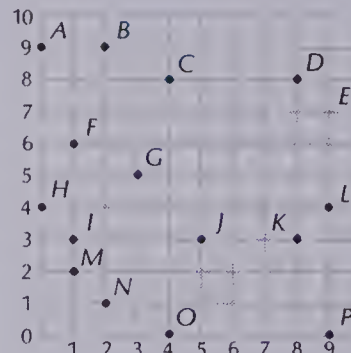
EXERCISES

Name the object at each location in the above 5 by 5 grid.

1. (3, 1) 2. (4, 4) 3. (0, 3) 4. (1, 2)
nut pine cone leaf flower

Use coordinates to describe the location of each object.

5. tree (2,4) 6. squirrel (3,3) 7. nest (4,2) 8. bird (2,0)



Write the ordered pair for the location of each letter on the 10 by 10 grid.

9. B (2,9) 10. L (9,4) 11. D (8,8) 12. I (1,3)
13. G (3,5) 14. J (5,3) 15. A (0,9) 16. P (9,0)

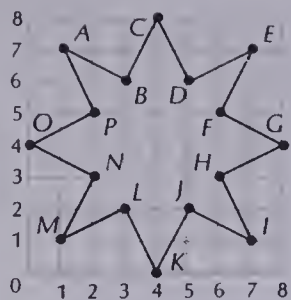
What letter is at each location?

17. (1, 6) F 18. (10, 7) E 19. (8, 3) K 20. (4, 8) C
21. (1, 2) M 22. (2, 1) N 23. (4, 0) O 24. (0, 4) H

Using the Exercises

- Questions 1 to 4 provide practice in locating a point, given the coordinates of the point.
- Questions 5 to 8 provide practice in writing the coordinates of a given point.
- In questions 9 to 24, more practice is provided using a larger grid.

PRACTICE



Write the coordinates for the location of each letter on the 8 by 8 grid

1. P (2,5) 2. F (6,5) 3. M (1,1) 4. J (5,2)
5. K (4,0) 6. E (7,7) 7. L (3,2) 8. G (8,4)

What letter is at each location?

9. (7, 1) I 10. (2, 3) N 11. (1, 7) A 12. (4, 8) C
13. (3, 6) B 14. (6, 3) H 15. (0, 4) O 16. (5, 6) D

17. On a 10 by 10 grid, make a dot for each ordered pair. Join them in the order in which they are given.
(5, 9) (6, 7) (7, 8) (7, 6) (9, 6) (8, 5) (10, 4) (8, 3) (9, 2) (6, 2) (7, 1)
(6, 1) (6, 0) (4, 0) (4, 1) (3, 1) (4, 2) (1, 2) (2, 3) (0, 4) (2, 5) (1, 6)
(3, 6) (3, 8) (4, 7) (5, 9) Stop!

REVIEW

GR 1 City Schools ■ = 50 schools

Elementary	■■■■■
Secondary	■■■

1. How many elementary schools? 200
2. How many schools in all? 300

GR 2 Athletic Facilities

Pools	■■■■■
Arenas	■■■

3. How many arenas? 15
4. How many athletic facilities in all? 40
5. How many more pools than arenas? 10

GR 3 6. What is the average temperature for each month?

June 7°, July 10°, Aug. 9°, Sept. 3°

GR 4 Write the coordinates describing each location on the grid.

7. S (C,3) 8. T (A,2) 9. U (8,1) 10. V (0,0)

GR 5 11. Explain the meaning of each number in the pair (4, 7).
4 across, 7 up.

179

Assigning the Practice

Minimum: 1-17

Average: 1-17

Enriched: 1-17

Review Exercises

Questions	Objective	Pages
1-2	GR 1	170-171
3-5	GR 2	172-173
6	GR 3	174-175
7-10	GR 4	176-177
11	GR 5	178-179

Reinforcement

1. Make a set of cards showing grids without the numbers along the axes. Give the coordinates of one point and then have the students locate other points.

a. Play "Three in a Row". Use a pair of dice and a 6 x 6 grid with the axes numbered. Each player needs a set of coloured markers. The first player rolls the dice and makes an ordered pair from the numbers rolled, e.g., (2, 4) or (4, 2). A marker is placed on the grid at the designated point. Players alternate turns throwing the dice. Three markers in a row wins.

Enrichment

1. Provide worksheets of pictures that can be made by locating coordinate points on a grid and then connecting them with straight lines (similar to the picture the students made at the bottom of page 177.)

2. Ask the students to draw a simple, straight-line figure or design on a grid. Have them write the ordered pairs for the end points of each straight line in order. Other students can use these as clues to duplicate the figure or design.

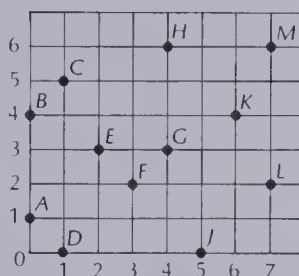
Extra Practice

Look at the grid to answer these questions.

1. Write the ordered pair for the location of each letter
- a. A (0,1) b. E (2,3) c. H (4,6)
d. J (5,0) e. L (7,2) f. B (0,4)
g. K (6,4) h. D (1,0) i. M (7,6)

2. Write the letter at each location

- a. (5, 0) J b. (7, 6) M c. (1, 0) D d. (0, 4) B
e. (1, 5) C f. (4, 3) G g. (3, 2) F h. (4, 6) H



Worksheet GR5

Pages 178-179

UNIT 8 LESSON 6

Objective GR6

Find the second coordinate of an ordered pair, given the first coordinate and the rule for the ordered pair.

Introducing the Lesson

Discuss relationships between pairs of numbers that the students encounter in daily life, e.g., 1 math class in 1 day, 4 math classes in 4 days; 2 apples for 35¢, 4 apples for 70¢; 1 km in 10 min, 2 km in 20 min; and so on. Point out that the continuation of these patterns can be anticipated because the pattern rule is regular. Display several related objects and have the students find some paired values, e.g., money (1 dime, 10 pennies; 2 dimes, 20 pennies), or coloured rods (1 green, 3 red; 2 green, 6 red).

Teaching the Lesson

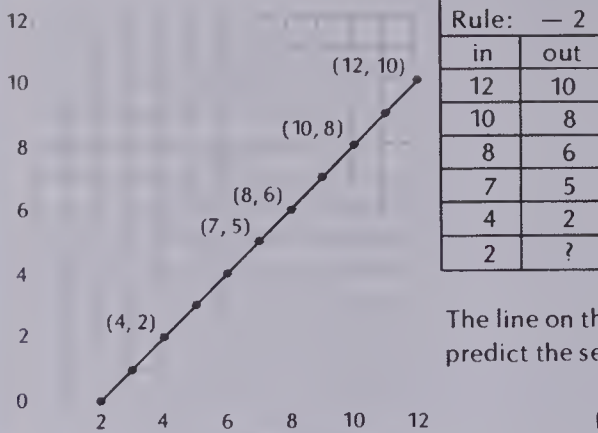
Point out the **subtract 2** relationship between the pairs of numbers in the chart at the top of page 180. Explain how the "in" and "out" numbers are ordered pairs and thus can be graphed. The input number is the first number of the ordered pair and is graphed using the horizontal axis. The output number is the second number of the ordered pair and is graphed using the vertical axis. Note the straight line that is formed when the points on the graph are connected.

Write the following incomplete chart on the chalkboard. Have the students use the chart rule to name the missing output numbers. Then ask them to use the digits to write ordered pairs.

Rule: + 5		
in	out	
0		(0, 5)
3		(3, 8)
7		(7, 12)
12		(12, 17)

Give the students a sheet of graph paper (provided with this *Teacher's Resource Book*). Show them how to make a graph of the ordered pairs. Point out that if no errors in calculating have been made, a straight line is again formed.

Predictable Pairs



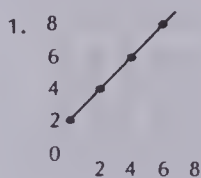
The Rule: - 2 forms each ordered pair.

$12 - 2 = 10$ (12, 10)
 $10 - 2 = 8$ (10, 8)
 $8 - 2 = 6$ (8, 6)
 $7 - 2 = 5$ (7, 5)
 $4 - 2 = 2$ (4, 2)

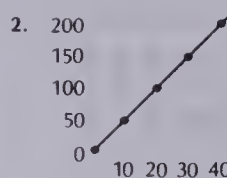
The line on the graph helps predict the second coordinate.

EXERCISES

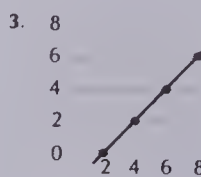
Use the graph to complete the chart.



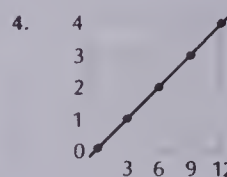
Rule: + 2	
in	out
2	4
6	8
0	2



Rule: × 5	
in	out
10	50
40	200
20	100



Rule: - 2	
in	out
8	6
4	2
2	0



Rule: ÷ 3	
in	out
3	1
12	4
9	3

Copy and complete the chart.

Rule: × 2	
in	out
8	16
12	24
16	32

Rule: ÷ 9	
in	out
36	4
72	8
144	16

Rule: ÷ 40	
in	out
160	4
480	12
600	15

Rule: ÷ 2	
in	out
4	2
96	48
156	78

180

Using the Exercises

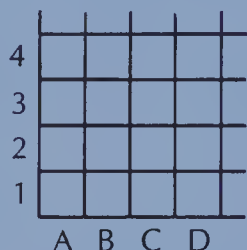
- For questions 1 to 4, students must use the graphs to complete the charts. Students must study the sets of ordered pairs for questions 3 and 4 and then name the pattern rule, also. Work questions 1 and 3 together with the class to help the students get started.
- Questions 5 to 8 require the students to name the output numbers using the rule provided.

Objective GR7

Locate places on a map using coordinates.

Introducing the Lesson

Show the following grid on an overhead projector or at the chalkboard. Point out that spaces rather than the lines of the axes are labelled. Explain that this kind of grid locates *regions* and not intersection points.



Name a few ordered pairs and have the students point to the *region* described. Explain that this kind of grid is used on maps.

Teaching the Lesson

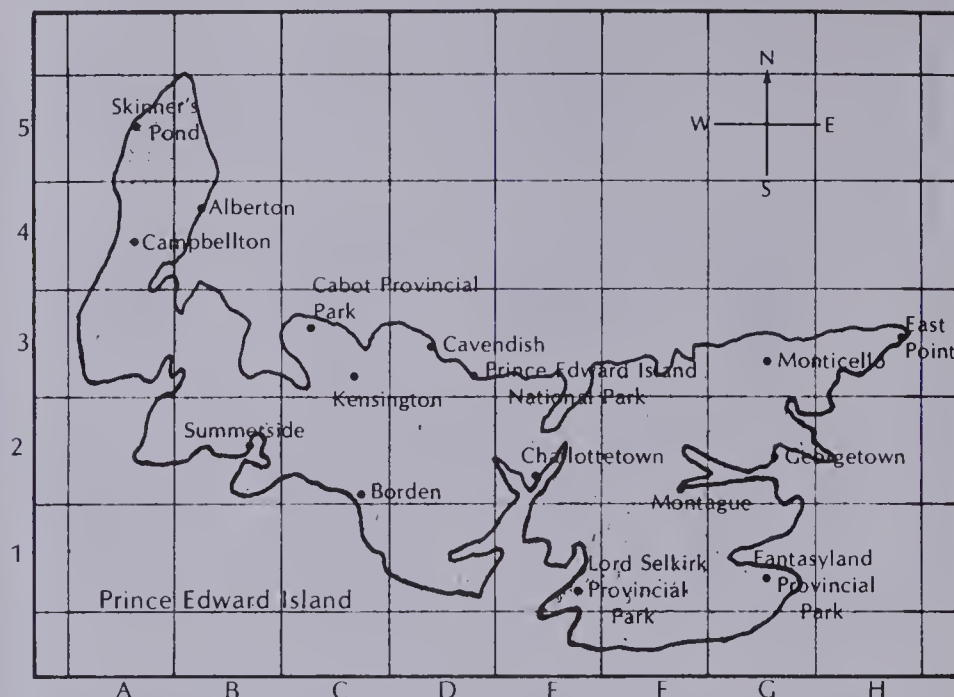
Refer to the example at the top of page 182 to illustrate the use of a grid to locate regions on a map. Note the letters on the spaces of the horizontal axis and the numbers on the spaces of the vertical axis. Ask the students to name the places found in these *regions*: (G, 3), (E, 1), and (B, 2). Then have them name the ordered pairs that describe the regions in which these places are found: Georgetown, Skinner's Pond, Cavendish.

Ask similar kinds of questions using the map of Calgary at the top of page 183.

Divide the students into small groups. Give each group a city (or provincial) map and a list of places. Have them name the ordered pairs which describe the regions on the map in which these places are found.

Map Grids

An ordered pair describes a map location. Charlottetown is located at (E, 2).

**EXERCISES**

Write the ordered pair that describes the location of each place.

1. Summerside (B, 2)
2. Montague (F, 2)
3. Campbellton (A, 4)
4. Cabot Provincial Park (C, 3)
5. P.E.I. National Park (D, 3)
6. Lord Selkirk Provincial Park (E, 1)
7. Monticello (G, 3)
8. Alberton (B, 4)
9. Kensington (C, 3)

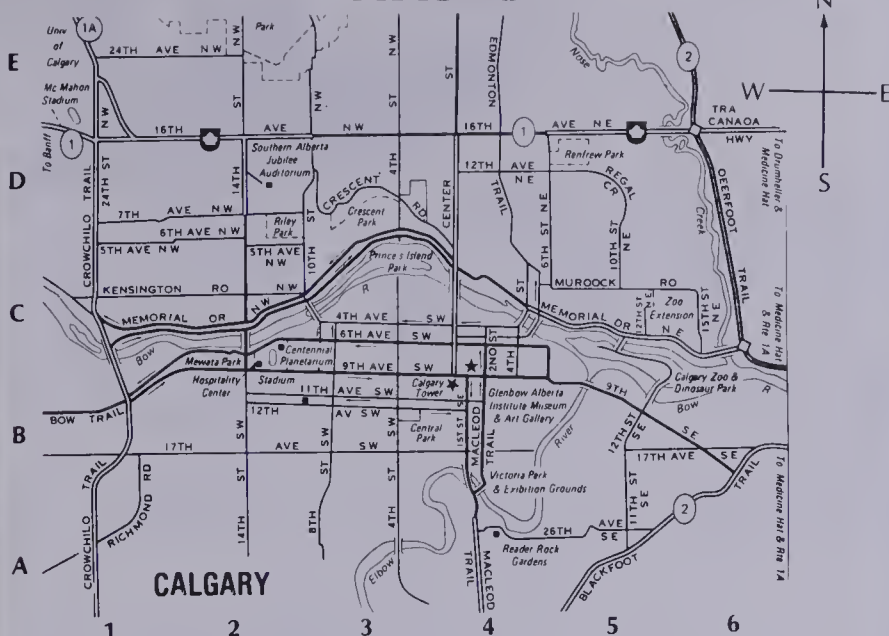
Write the name of the place found at these locations.

10. (A, 5) Skinner's Pond
11. (C, 2) Borden
12. (G, 1) Fantasyland Provincial Park
13. (H, 3) East Point
14. (G, 2) Georgetown
15. (D, 3) Cavendish P.E.I. National Park

Using the Exercises

- Questions 1 to 9 require the students to write the ordered pair describing the region in which each place is located. Remind the students that the first member of the ordered pair is always on the horizontal axis.
- Questions 10 to 15 require the students to name a place in the region described by an ordered pair. Note that the ordered pair (D, 3) in question 15 describes a region having two places.

PRACTICE



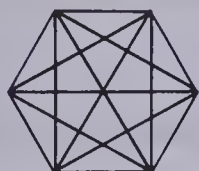
1. Name the street running east from (1, D) through (6, D).
16 Ave.
2. Name the main road running north from (6, C) through (6, E).
Deerfoot Trail
3. What road runs east along the north side of the Bow River, (1, C) to (6, C)?
Memorial Dr.

Write the coordinate location of each.

4. Calgary Tower (central) **(4, B)**
5. Univ. of Calgary (N.W.) **(1, E)**
6. 15 St. N.E. **(6, C)**
7. Victoria Park (S.E.) **(4, B)**
8. intersection of Richmond Rd and 17 Ave. S.W. **(1, B)**
9. intersection of Blackfoot Trail and 9 Ave. S.E. **(6, B)**

Crossroads

How many triangles can you find in the diagram?



54

183

Assigning the Practice

Minimum: 1-9
Average: 1-9
Enriched: 1-9

Reinforcement

1. Provide various city and provincial maps and lists of ordered pairs describing regions on these maps. Have the students name two or three important places found in each region described by an ordered pair.

2. Give the students the following grid and list of ordered-pairs colouring instructions.

When they have coloured each region on the grid as specified, all grids should form the same pattern.

- (A, 1) blue, (A, 2) red,
(A, 3) green, (A, 4) yellow
(B, 1) green, (B, 2) yellow
(B, 3) blue, (B, 4) red
(C, 1) green, (C, 2) yellow
(C, 3) blue, (C, 4) red
(D, 1) blue, (D, 2) red
(D, 3) green, (D, 4) yellow

4	Y	R	R	Y
3	G	B	B	G
2	R	Y	Y	R
1	B	G	G	B
	A	B	C	D

Enrichment

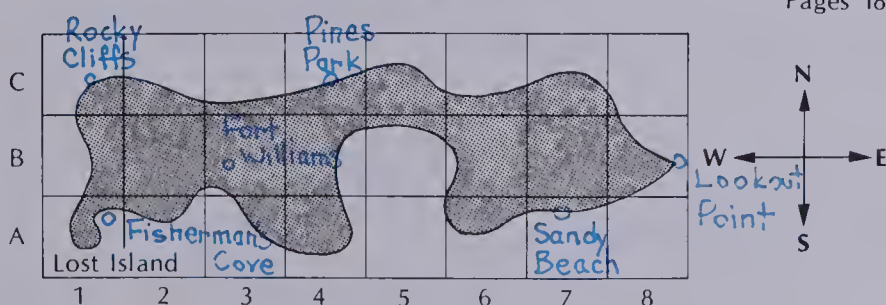
1. Assign *Crossroads* at the bottom of page 183. Discuss the strategies the students used in solving the problem.

2. Have the students draw a map of an imaginary island and make a grid on top of it (similar to that in the Extra Practice section). Ask them to make a list of places on the map and then to describe with ordered pairs the region in which these places are located. The maps can then be exchanged with a partner who will write these places on the map.

Extra Practice

Worksheet GR7

Pages 182-183



1. Use the ordered pairs to put each place on Lost Island.
 - a. (3, B) Fort William
 - b. (1, A) Fisherman's Cove
 - c. (4, C) Pines Park
 - d. (7, A) Sandy Beach
 - e. (8, B) Lookout Point
 - f. (1, C) Rocky Cliffs
2. What is located north of Fisherman's Cove? **Rocky Cliffs**
3. What is located east of Fort William? **Lookout Point**
4. What is located west of Pines Park? **Rocky Cliffs**

Objective M14

Find the radius, diameter, and circumference of a circle.

Introducing the Lesson

Ask the students how we tell the age of a tree. Point out that an accurate picture of a tree's age can be found by looking at its cross section. Even without a cross section, one can see that trees of the same kind with wider trunks are older.

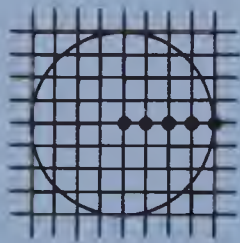
Refer the students to the top of page 184. Explain that the easiest measurement to take of a tree is its **circumference**, which gives a clue to its age. Point out the definition given of circumference. Also explain the definition given of **diameter** and **radius**.

Teaching the Lesson

Give each student a worksheet of various circles drawn on centimetre grid paper. (A centimetre grid worksheet is included with this *Teacher's Resource Book*.) For each, ask the students to name and to label properly the *radius* and *diameter*. Point out that the diameter is equal to the radius $\times 2$ and that the radius is equal to the diameter $\div 2$. For example:

$$R = 4 \text{ cm}$$

$$D = 8 \text{ cm}$$

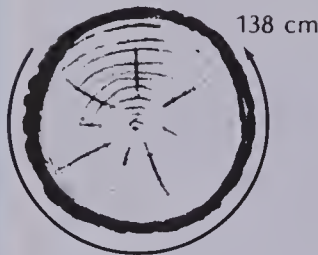
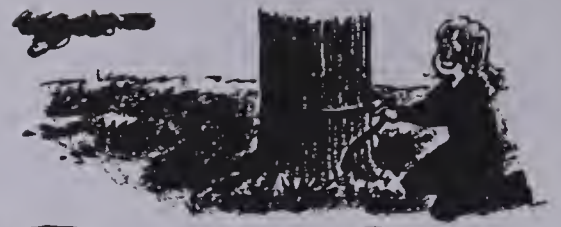


Give each student a piece of string. Have them approximate the circumferences of the circles on the sheet by counting how many diameter lengths of string fit around the rims. Let the students conclude that the circumference of a circle is approximately diameter $\times 3$.

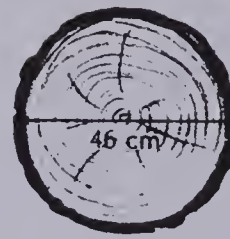
Have the students then name and record the circumferences of each circle on the sheet.

Talk about how one could determine the circumference, diameter, and radius of tree trunks.

Circles



Circumference is the distance around a circle.



Diameter is the distance from rim to rim going through the centre.



Radius is the distance from the rim to the centre.

$$\text{Circumference: Diameter} \times 3 \text{ (approx.)}$$

$$\text{Diameter: Circumference} \div 3 \text{ (approx.)}$$

$$\text{Diameter} = \text{Radius} \times 2$$

$$\text{Radius} = \text{Diameter} \div 2$$

EXERCISES

Find the radius of a circle whose diameter is:

1. 4 cm 2. 14 cm 3. 30 cm 4. 84 cm 5. 58 cm
 2 cm 7 cm 15 cm 42 cm 29 cm

Find the approximate circumference of a circle whose diameter is:

6. 1 cm 7. 5 cm 8. 12 cm 9. 25 cm 10. 36 cm
 3 cm 15 cm 36 cm 75 cm 108 cm

Find the approximate diameter of a circle whose circumference is:

11. 9 cm 12. 18 cm 13. 27 cm 14. 42 cm 15. 63 cm
 3 cm 6 cm 9 cm 14 cm 21 cm

Find the diameter of a circle whose radius is:

16. 3 cm 17. 5 cm 18. 22 cm 19. 18 cm 20. 49 cm
 6 cm 10 cm 44 cm 36 cm 98 cm

Using the Exercises

- Questions 1 to 20 require the students to find radius, diameter, and circumference. They will need to choose one of the following formulas. Their work might look like:

$$R = D \div 2 \quad C \approx D \times 3 \quad D \approx C \div 3 \quad D = R \times 2$$

$$R = 84 \text{ cm} \div 2 \quad C \approx 5 \text{ cm} \times 3 \quad D \approx 27 \text{ cm} \div 3 \quad D = 5 \text{ cm} \times 2$$

$$R = 42 \text{ cm} \quad C \approx 15 \text{ cm} \quad D \approx 9 \text{ cm} \quad D = 10 \text{ cm}$$

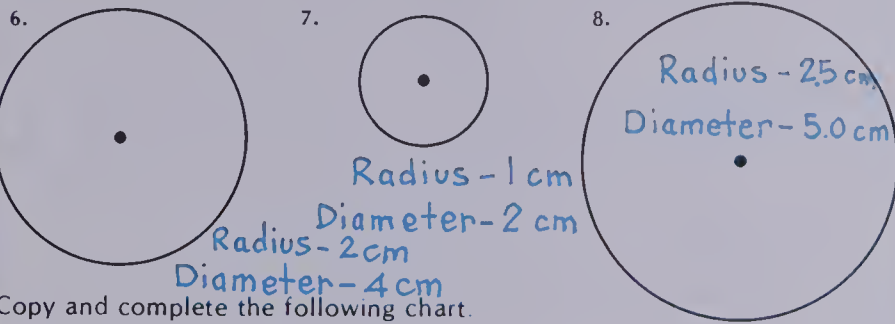
*Note that \approx means "approximately".

PRACTICE

Copy and complete the following chart.

	Circle	Circumference	Diameter	Radius
1.	A	12 cm	4 cm	2 cm
2.	B	30 cm	10 cm	5 cm
3.	C	90 cm	30 cm	15 cm
4.	D	18.9 cm	6.3 cm	3.15 cm
5.	E	14.4 cm	4.8 cm	2.4 cm

Measure the radius and diameter in centimetres.



Copy and complete the following chart.

	Tree	Circumference	Diameter (approx.)	Radius (approx.)
9.	Paper Birch	120 cm	40 cm	20 cm
10.	White Cedar	108 cm	36 cm	18 cm
11.	Tamarack	84 cm	28 cm	14 cm

Flipping Out

There are 7 dimes in a row, all heads up
Can you get the coins to show all tails
by turning them over 3 at a time?



185

Assigning the Practice

Minimum: 1-11

Average: 1-11

Enriched: 1-11

Reinforcement

1. Provide pairs of students with different-sized cans, string, and centimetre rulers. Have them measure and record the circumference and diameter of each can. Then ask them to divide each of the circumferences by 3 and compare the results of the computations for diameter to the actual measures of the cans' diameters.

2. Divide the students into small groups. Give each group a measuring tape. Ask them to measure the circumference of several specified trees on school grounds. Then have them compute the diameter and radius for each.

3. Provide cardboard circles of different sizes. Ask the students to measure the radius, diameter, and circumference for each.

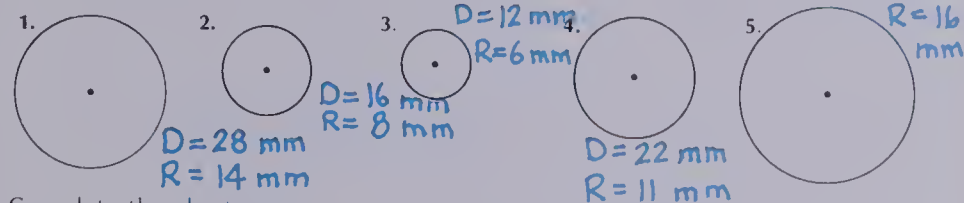
Enrichment

1. Assign *Flipping Out* at the bottom of page 185.

2. Pick out two or three trees common to your area. Ask the students to research them and to make an illustrated story of their findings on a poster. Then hold a contest to see which students can find and measure specimens of these types of trees.

Extra Practice

Measure the radius and the diameter in millimetres



Complete the chart

	Circle	Diameter	Radius	Circumference
6.	A	6 cm	3 cm	18 cm
7.	B	8 mm	4 mm	24 mm
8.	C	24 mm	12 mm	72 mm
9.	D	10.8 cm	5.4 cm	32.4 cm

Worksheet M14

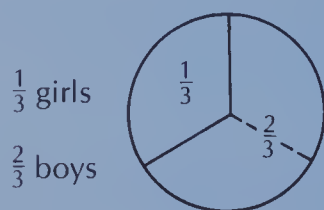
Pages 184-185

Objective GR8

Interpret and make circle graphs.

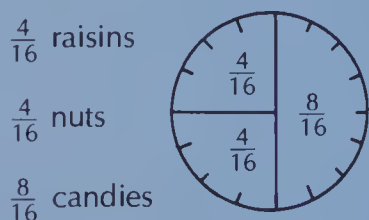
Introducing the Lesson

Have two boys and one girl come to the front of the room. Ask, "What fraction of these students are girls?" *One third.* "What fraction of these students are boys?" *Two thirds.* Explain that this information can be represented in a new kind of graph, a **circle graph**. Draw a circle on the chalkboard and divide it in thirds. Then ask a student to shade the part represented by the girl and then the part represented by the boys.



Show the students a plate which has on it 4 raisins, 4 nuts, and 8 candies. Ask, "How many items are there in all on the plate? What fractional part of them are raisins? nuts? candies?"

Point out that the amounts of these things on the plate can be represented in a circle graph. Draw a circle on the chalkboard. Explain that the circle will be divided into sixteen parts and that each snack will be represented. Let the students determine the size of the part of the circle needed for each snack from the fractions named earlier.



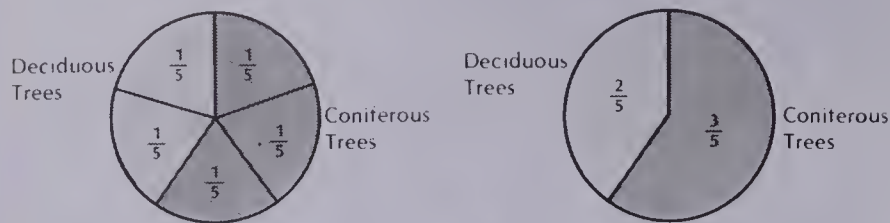
Teaching the Lesson

Examine the circle graphs at the top of page 186. Discuss what the two coloured parts of the graphs represent. (Explain the meaning of deciduous and coniferous.) Ask questions about the graphs so that the students interpret correctly the information they represent.

Discuss, also, the circle graph at the top of page 187.

Circle Graphs

All the trees of Canada's forests are represented in the circle graph.



2 out of every 5 trees are deciduous.



3 out of every 5 trees are coniferous.



EXERCISES

Use the circle graphs to answer these questions.

- Which classifications of trees are represented in the circle graphs?

Deciduous and Coniferous

- Of all the trees in Canada, what fraction are deciduous?

2/5

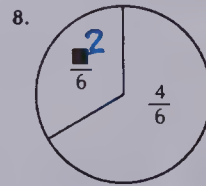
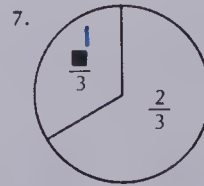
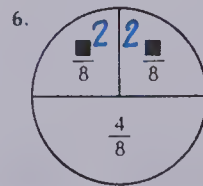
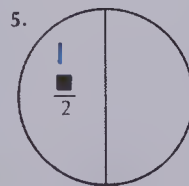
- What type of tree is more common in Canada?

Coniferous

- Do the circle graphs tell you the number of coniferous trees in Canada?

No

Copy and complete the missing fractional parts.



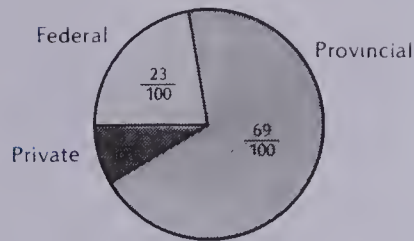
Using the Exercises

- Questions 1 to 4 require the students to interpret the circle graphs at the top of the page. Students should be able to do this independently as some interpretation of the graphs was made during the lesson.
- Questions 5 to 8 give practice in naming fractional parts of a whole. This skill is useful in the understanding of the fractional parts of a circle graph.

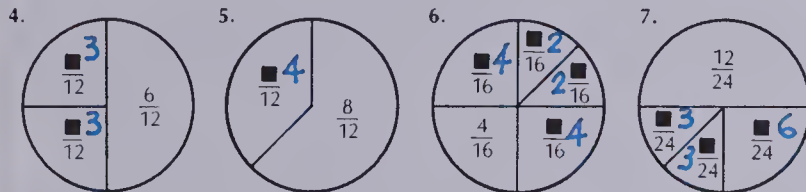
PRACTICE

- Who owns most of Canada's forest lands? **The Provincial Government**
- Does the federal government own more or less forest land than the private sector? **More**
- The provincial governments own 2, 3, 4, or 5 times the amount of forest land owned by the federal government? **3**

Ownership of Canada's Forest Lands



Copy and complete the missing fractional parts.



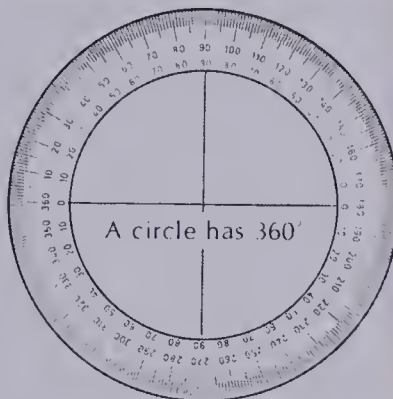
Make a circle graph representing this information.

- There are 24 children in class; 12 have brown eyes, 12 have blue eyes.

Protractor Circles

Make a circle with a protractor
Divide the circle into these fractional parts

- $\frac{180}{360}$, $\frac{90}{360}$, $\frac{90}{360}$
- $\frac{90}{360}$, $\frac{90}{360}$, $\frac{45}{360}$, $\frac{45}{360}$
- $\frac{180}{360}$, $\frac{10}{360}$, $\frac{40}{360}$, $\frac{20}{360}$, $\frac{20}{360}$



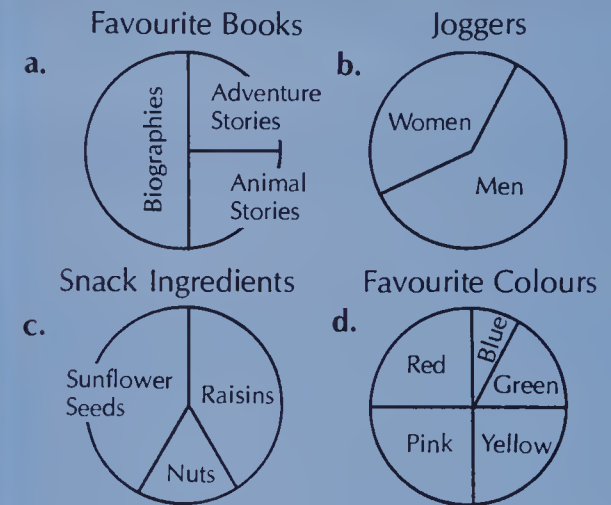
187

Assigning the Practice

Minimum: 1-7
Average: 1-8
Enriched: 1-8

Reinforcement

1. Prepare and display the following circle graphs along with a list of interpretive questions which the students can answer.



2. Have the students make circle graphs which represent the following sets of information.

- There are 18 students; 6 walk to school, 12 are driven to school.
- There are 12 men; 6 play golf, 3 play tennis, 3 play squash.

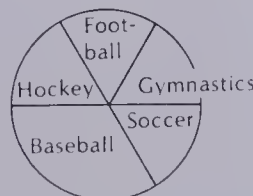
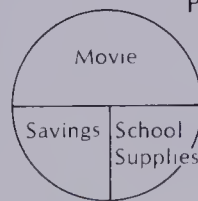
Enrichment

- Assign *Protractor Circles* at the bottom of page 187.
- Have the students make a circle graph to show how they typically spend the 24 hours in a day.

Extra Practice

Use the circle graphs to answer these questions.

- One week Colette used her allowance as shown in the graph.
 - How did Colette spend most of her allowance? **Movie**
 - What fraction of her allowance did she save? **$\frac{1}{4}$**
 - Did she spend more on school supplies than she saved? **No**
- A survey was made of Grade 5 students to show the sports they played. The results of the survey are shown in the graph.
 - What fraction of the students play soccer? **$\frac{1}{6}$** baseball? **$\frac{2}{6}$**
 - Which sport had the greatest number of players? **Baseball**
 - Does the graph tell you that both boys and girls played hockey? **No**



Worksheet GR8

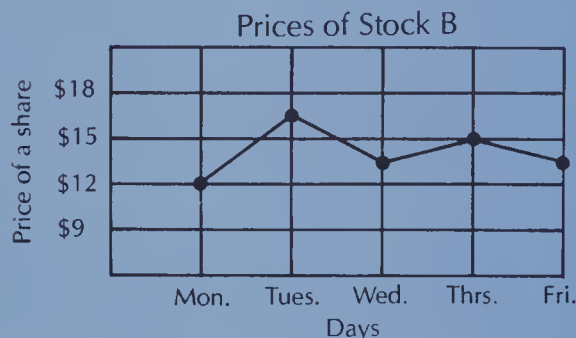
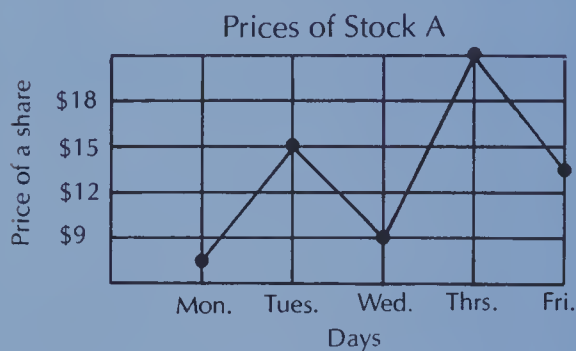
Pages 186-187

Objective PS7

Solve problems involving the reading and interpreting of graphs.

Introducing the Lesson

Show the following line graphs representing the prices of two different stocks for one week. Discuss the graphs and then ask the students which stock might be less risky to buy.



Have the students give the reasons for their choices. Point out how graphs can be useful in decision making.

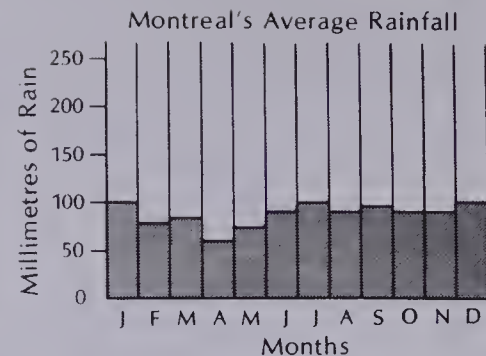
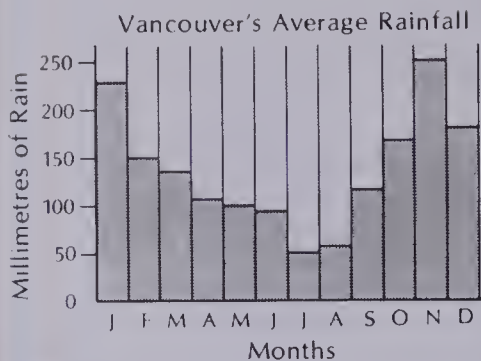
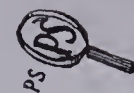
Teaching the Lesson

Ask the students which city they think has more rain (on the average) in July and August: Vancouver or Montreal. After some guesses have been made, have the students look at the bar graphs at the top of page 188 representing the average rainfall of these two cities. Discuss the labels and titles of the graphs and then have the students answer your question. Point out how graphs are useful in problem solving.

Compare the amounts of rainfall during other months. Discuss amounts of rainfall for various seasons for each city.

Point out that all four kinds of graphs studied in this unit (pictograph, bar graph, line graph, circle graph) provide a clear picture of some data.

Problem Solving



EXERCISES

Use the graphs to answer these questions.

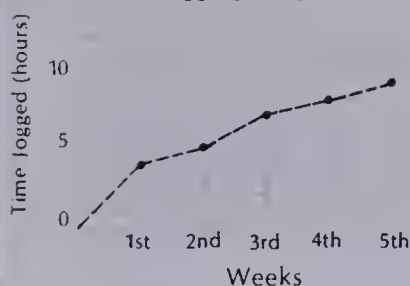
- What kind of graphs are used? **Bar graphs**
- Which cities are represented by the graphs? **Vancouver and Montreal**
- What unit of measure is used to report the rainfall? **millimetres**
- In which month does Vancouver have the most rain? Estimate the amount of rain for that month. **November 250 mm**
- Which city has more rain in January? **Vancouver**
Estimate the amount of rain each city has in January. **Vancouver - 225 mm Montreal - 100 mm**
- During which months does Montreal have more rain than Vancouver? **June, July, August**
- Estimate the total amount of rainfall Vancouver has for November, December, and January. **650 mm**
- Estimate the total amount of rainfall Montreal has for November, December, and January. **300 mm**
- During which spring month does Montreal have the least amount of rain? **April**

Using the Exercises

- Questions 1 to 3 elicit information from the titles and labels of the bar graphs at the top of the page.
- Solutions to questions 4 to 9 depend on the proper interpretation of the bar graphs.

PRACTICE

Jogging Progress



- How many weeks of jogging have been graphed so far? **5**
- During which week did the jogger run for 8 h? **4th**
- About how much time was spent jogging each week?
4, 5, 7, 8, 9
- How long do you predict the jogger will run the 6th week?
10 h

REVIEW

Copy and complete each chart.

GR 6

1. Rule: $\times 7$

in	out
9	63
18	126

2. Rule: $+ 6$

in	out
98	104
3.5	9.5

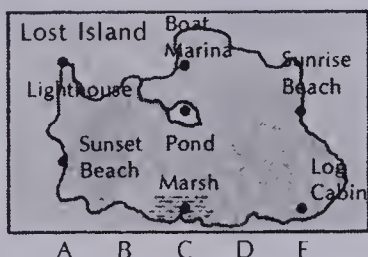
3. Rule: $- 4$

in	out
102	98
67	2.7

4. Rule: $\div 6$

in	out
72	12
216	36

GR 7



- What is at each location? **Marina**
5. (A, 4) 6. (C, 1) 7. (A, 2) 8. (C, 4)
- Lighthouse Marsh Sunset Beach**
- Write the ordered pair for each location.
9. pond **(C, 3)** 10. sunrise beach
11. log cabin **(E, 1)** **(E, 3)**

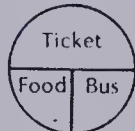
M14

What are the approximate diameter and radius for each circumference?

12. 24 cm **8, 4 cm** 13. 42 cm **14, 7 cm** 14. 72 cm **24, 12 cm**

GR 8

Costs in
Going to
a Movie



15. What costs the most? **Ticket**
16. Compare the cost of the food and the bus. **They are equal.**
17. Compare costs of bus and ticket.

Ticket is twice as much.

189

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-4	GR 6	180-181
5-11	GR 7	182-183
12-14	M14	184-185
15-17	GR 8	186-187

Reinforcement

Have the students work in pairs. Provide each pair of students with one of the four following kinds of graphing situations. Ask the students to make the graph indicated and then to make a list of questions about the graph. Students keep exchanging graphs and questions until all four kinds of graphs have been used by everyone.

- Make a pictograph showing the number of offices in two highrise buildings. Let \bullet represent 10 offices. Building A has 95 offices. Building B has 120 offices.
- Make a bar graph showing the number of players using a tennis court one week-end. On Saturday 24 people played tennis. On Sunday 36 people played tennis.
- Make a line graph of the high temperature each day during the Smith family's summer trip: Saturday 21°C , Sunday 18°C , Monday 20°C , Tuesday 20°C , Wednesday 23°C , and Thursday 24°C .
- Make a circle graph of the plants in Mrs. Murphy's vegetable garden: $\frac{10}{20}$ bean plants, $\frac{5}{20}$ tomato plants, $\frac{5}{20}$ pepper plants.

Enrichment

Ask the students to bring in examples from newspapers and magazines of the four kinds of graphs studied in this unit. Display and discuss the information represented in them.

Problem Solving Activities

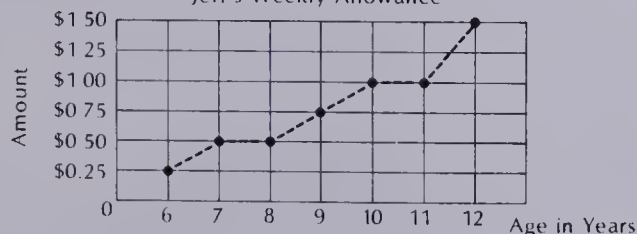
Assign Level 5, Unit 8

Extra Practice

Worksheet PS7

Pages 188-189

Jeff's Weekly Allowance



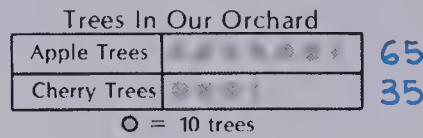
- What was Jeff's allowance when he was 6? **25¢** 8? **50¢** 10? **\$1.00**
- At what ages did his allowance stay the same as the year before? **8, 11**
- When did his allowance make the greatest jump? **12** How much? **50¢**
- At age 12, how much allowance did Jeff get in a whole year? **\$78.00**

Unit 8 Objective	Test Questions	Pages
GR 1	1	170-171
GR 2	2	172-173
GR 3	3-4	174-175
GR 4,5	5-9	176-179
GR 6	10-11	180-181
GR 7	12-17	182-183
GR 8	18-19	186-187

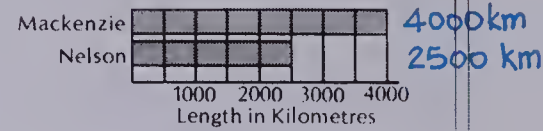
TEST

UNIT 8

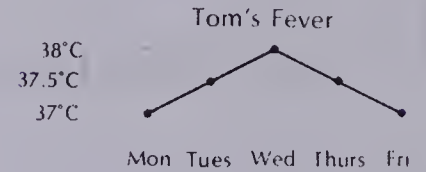
1. How many trees are there of each kind?



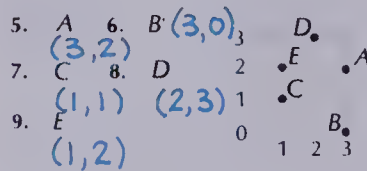
2. How long is each river?



3. On what day was Tom's fever the highest? **Wed.**
4. What was Tom's temperature on Thursday? **37.5°C**



Write the coordinates describing each location on the grid.

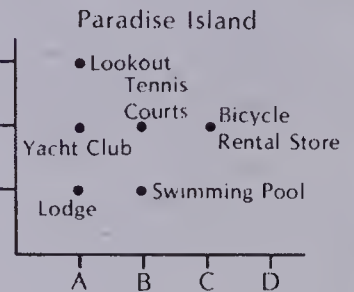


Copy and complete each chart.

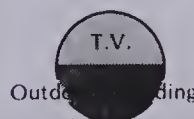
10. Rule: $\div 5$		11. Rule: $\times 8$	
in	out	in	out
450	90	36	288
35	0.7	32	256

What is at each location?

12. (C, 2) **Bicycle Rental**
13. (B, 1) **Swimming Pool**
14. (A, 2) **Yacht Club**
15. lookout (A, 3)
16. lodge (A, 1)
17. tennis courts (B, 2)



Jo's Leisure Time



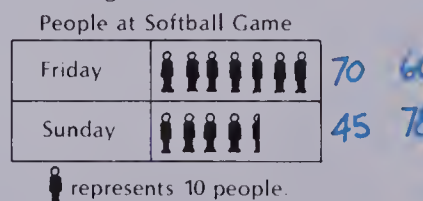
18. How is most of Jo's leisure time spent? **T.V.**
19. Compare the time spent reading to the time spent outdoors. **They are equal.**

190

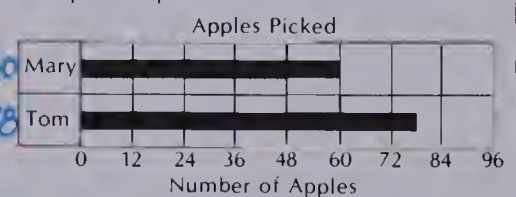
Post-test

Unit 8

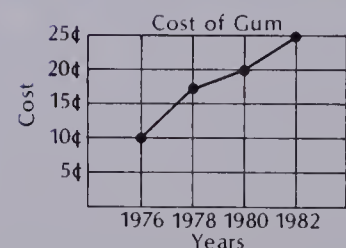
1. How many people were at each game?



2. How many apples did each person pick?



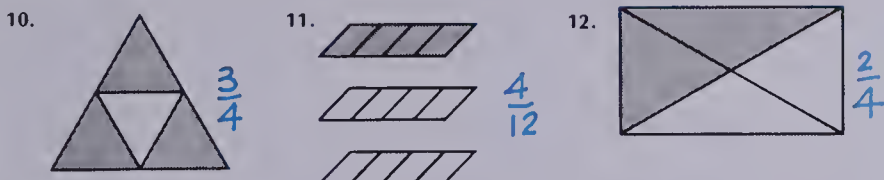
3. How much did gum cost in 1980? **20¢**
4. When was the greatest price increase? **1976-1978**



Write as a decimal.

1. 3 tenths **0.3** 2. 29 hundredths **0.29** 3. 1 hundredth **0.01** 4. 7 tenths **0.7**
 5. $\frac{1}{2}$ **0.5** 6. $\frac{1}{4}$ **0.25** 7. $\frac{3}{10}$ **0.3** 8. $\frac{4}{5}$ **0.8** 9. $\frac{33}{100}$ **0.33**

Write the fraction for the shaded part.



Multiply.

13. $\frac{1}{2} \times 8$ **4** 14. $\frac{2}{3} \times 9$ **6** 15. $\frac{3}{5} \times 10$ **6** 16. $\frac{7}{10} \times 20$ **14**

Write the ratio.

17. 6 stars to 5 sticks **$\frac{6}{5}$** 18. 3 men to 2 women **$\frac{3}{2}$** 19. 1 large to 3 small **$\frac{1}{3}$**

Write a ratio equal to the given ratio.

20. $\frac{2}{3}$ **$\frac{4}{6}$** 21. $\frac{8}{10}$ **$\frac{4}{5}$** 22. $\frac{1}{2}$ **$\frac{2}{4}$** 23. $\frac{3}{10}$ **$\frac{6}{20}$** 24. $\frac{12}{16}$ **$\frac{3}{4}$**

Find the missing term.

25. $\frac{3}{10} = \frac{30}{\blacksquare}$ **100** 26. $\frac{\blacksquare}{3} = \frac{7}{21}$ **1** 27. $\frac{3}{4} = \frac{\blacksquare}{24}$ **18** 28. $\frac{10}{\blacksquare} = \frac{2}{5}$ **25** 29. $\frac{3}{6} = \frac{\blacksquare}{2}$ **1**

Are the fractions equivalent?

30. $\frac{2}{3}$ and $\frac{3}{9}$ **No** 31. $\frac{1}{2}$ and $\frac{7}{13}$ **No** 32. $\frac{2}{5}$ and $\frac{4}{10}$ **Yes** 33. $\frac{1}{4}$ and $\frac{4}{16}$ **Yes**

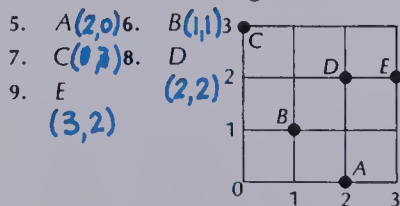
Write < or >.

34. $\frac{1}{4}$ **<** $\frac{3}{4}$ 35. $\frac{4}{5}$ **>** $\frac{2}{5}$ 36. $\frac{1}{2}$ **<** $\frac{7}{10}$ 37. $\frac{3}{5}$ **>** $\frac{3}{10}$

Solve.

38. The lengths of two sides of a rectangle are 11.34 cm and 5.86 cm.
What is the perimeter of the rectangle? **34.40 cm**

Write the coordinates describing each location on the grid.



Copy and complete the chart.

10. Rule: $\times 4$	
in	out
4	16
20	80

11. Rule: $- 2$	
in	out
16	14
24.5	22.5

What building is at each location?

12. (D, 4) **Museum** 13. (A, 4) **Science Centre** 14. (B, 2) **Library**

Write an ordered pair for each

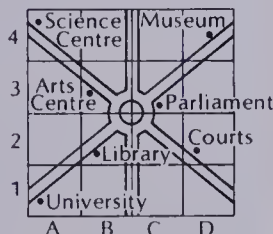
15. Courts **(0,2)** 16. University **(A,1)** 17. Arts Centre **(B,3)**

Space in Store



18. Which department had the most space? **Ladies' Wear**

19. What fraction of the space was used by the shoe department? **$\frac{1}{6}$**



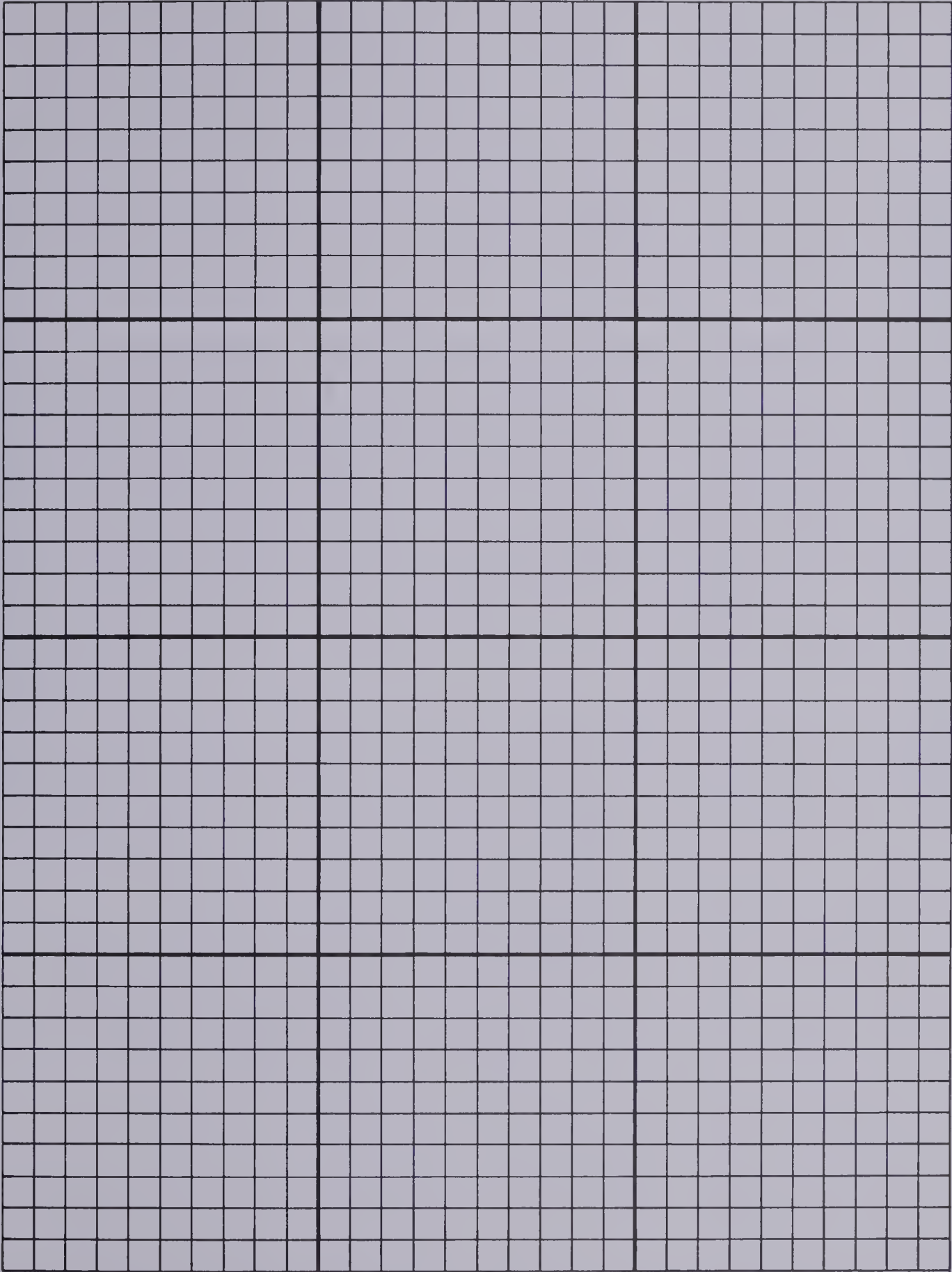
UNIT 9

Decimals

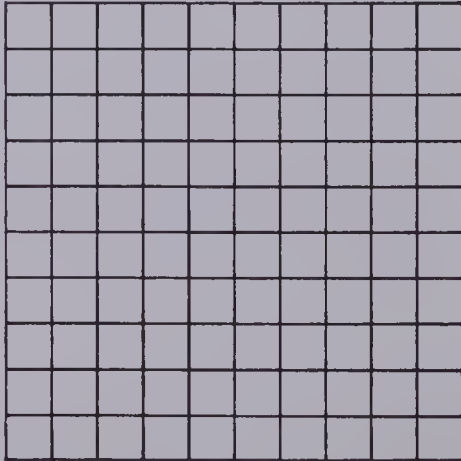
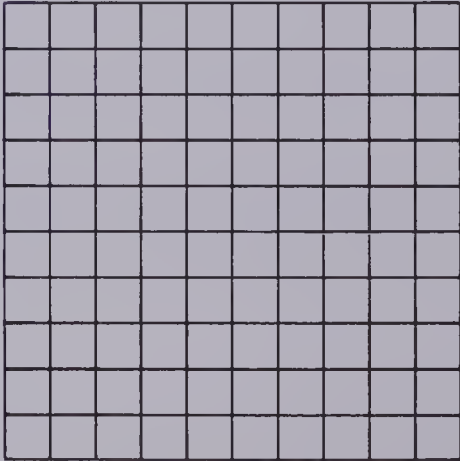
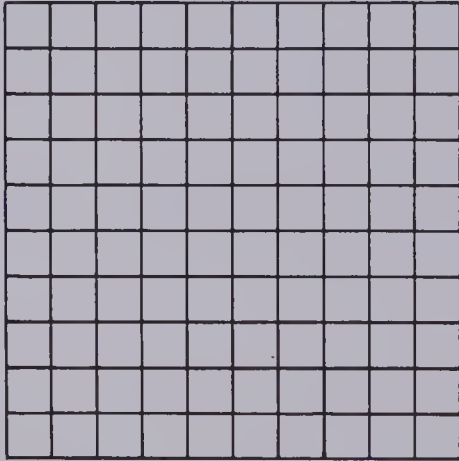
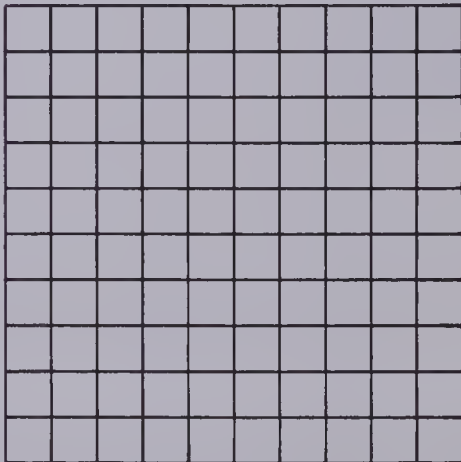
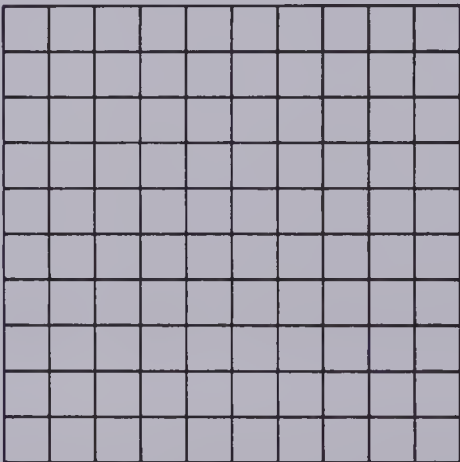
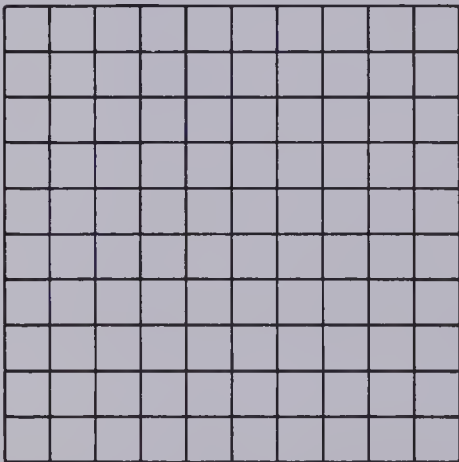
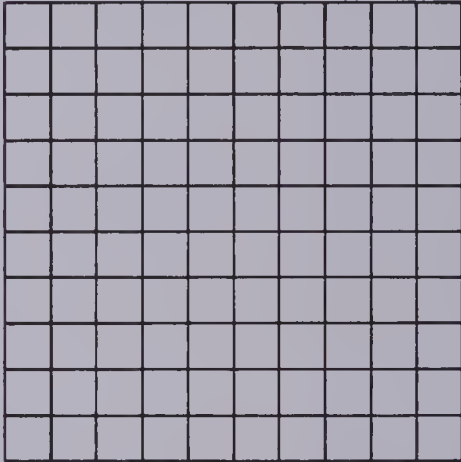
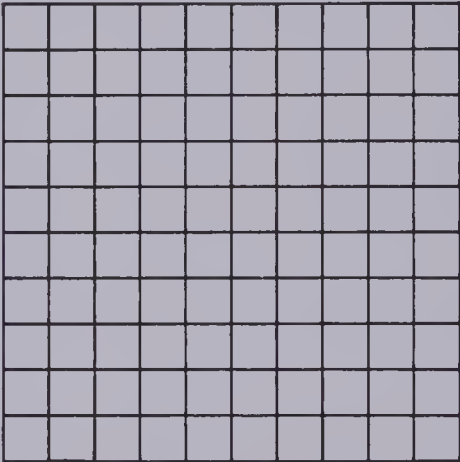
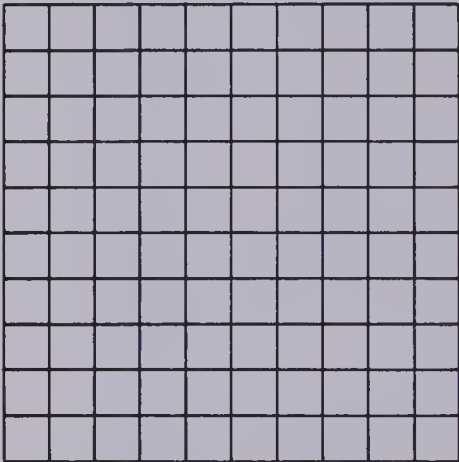
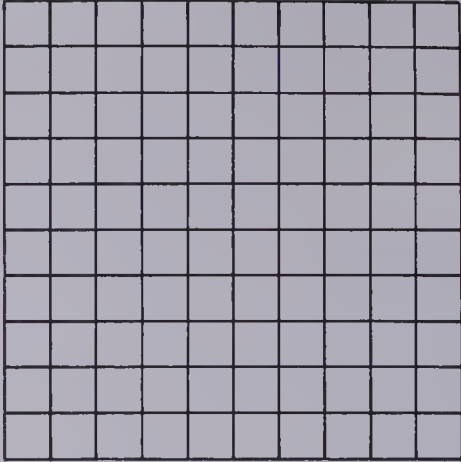
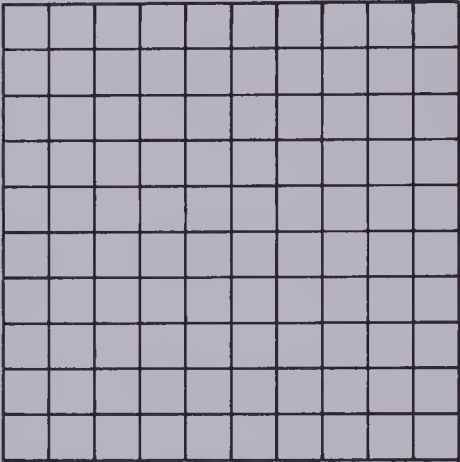
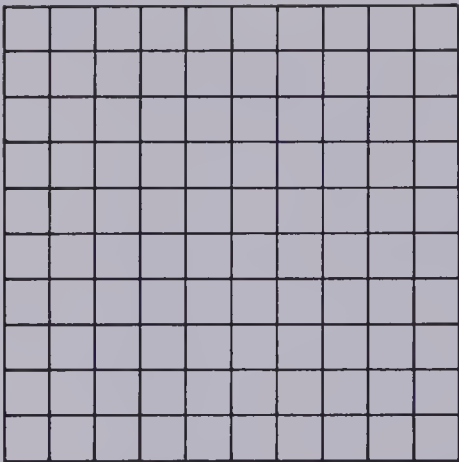
Theme: Farming

Lesson		Objective	Pages
Preview		Multiply and divide money.	193
1	A36	Multiply a decimal less than one in hundredths by a whole number.	194–195
2	A37	Multiply a decimal greater than one in hundredths by a whole number.	196–197
3	A38	Multiply a whole number by a decimal in tenths.	198–199
4	A39	Multiply a decimal less than one in tenths by another decimal in the same form.	200–201
5	A40	Multiply a decimal greater than one in tenths by a decimal less than one in tenths.	202–203
6	A41	Multiply a decimal greater than one in tenths by another decimal in the same form.	204–205 206–207
7	N18	Round decimals to the nearest tenth; estimate products.	
8	A42	Divide a decimal in tenths or hundredths by a whole number without a remainder.	208–209
9	A43	Write a fraction as a decimal in tenths, hundredths, or thousandths.	210–211
10	PS8	Use estimation to choose reasonable solutions to word problems.	212–213
Test		Decimals	214
Review		Graphs	215

10 × 10 Grids



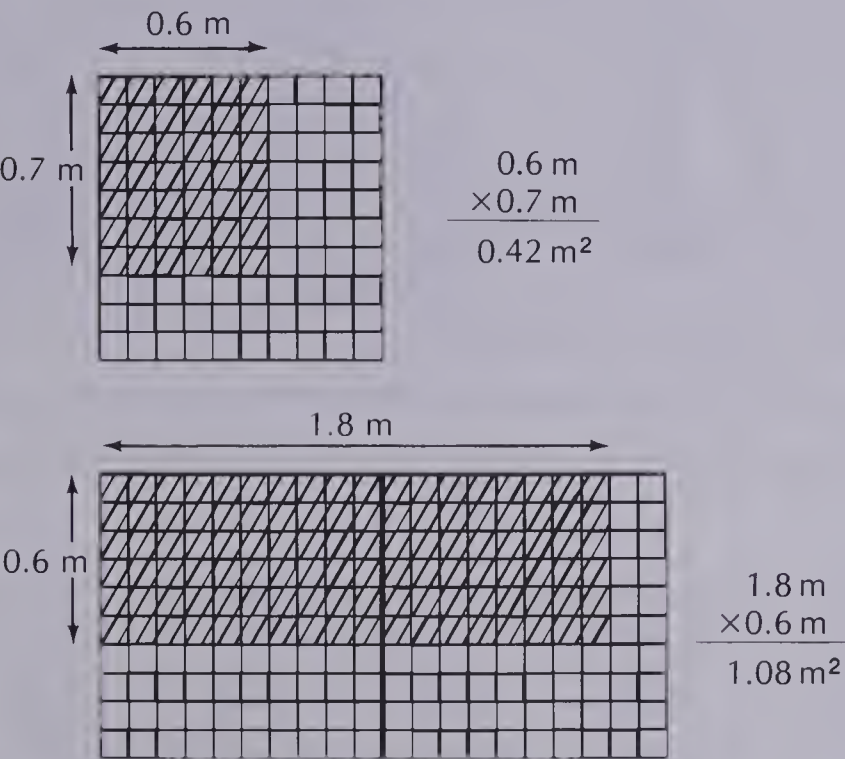
10 × 10 Grids



About This Unit

- The purpose of this unit is to:
1. extend skill in the multiplication of decimals;
 2. extend skill in the rounding of decimals;
 3. develop skill in division with decimals;
 4. relate decimals to fractions;
 5. use estimation to check the reasonableness of answers;
 6. apply computational skills with decimals to problem-solving situations.

The work of this unit is heavily dependent on the successful completion of earlier units of this book. Units 3, 4, and 6 dealt with multiplication and division of money, which provides an easy-to-understand model for the work of this unit. The study of rectangular area problems in Unit 5 prepares the student for their use as pictorial examples of the multiplication of decimals. Students can count squares in the following examples to find the areas. The fact that tenths times tenths equals hundredths is also clearly illustrated.



In this unit, the Reinforcement and Enrichment sections contain many suggestions for the use of concrete materials in real-life situations in order to develop the meanings of the concepts to be taught. Also, one must not overlook the many starting points offered in this unit for the use of estimating skills in checking the reasonableness of answers. For this it is important that the students

have successfully completed the fraction lessons of Unit 7.

$$\begin{array}{r} 8.4 \\ \times 0.6 \\ \hline \end{array}$$

→

$\frac{1}{2} \times 8 = 4$

→

$$\begin{array}{r} 8.4 \\ \times 0.6 \\ \hline 5.04 \end{array}$$

5.04 is a reasonable product.

Ideas

Since the theme of this unit is *Farming*, it would be well to discuss various terms and measures related to farming. The following list includes terms and measures used in this unit. (a is the symbol for “are”.)

hectare:	100 m ² = 1 a
	100 a = 1 ha
	100 ha = 1 km ²
tonne:	1000 kg = 1 t
kilogram:	1000 g = 1 kg
cubic metre:	length, 1 m
	width, 1 m
	height, 1 m
	1 m ³ = 1000 dm ³

sow seeds
 yield
 crate
 harvest
 co-op
 fertilizer
 orchard
 cannery
 market
 poultry

UNIT 9

DECIMALS



Unit 9 Objectives	Test Questions	Pages
A36	1-5	194-195
A37	6-10	196-197
A38	11-15	198-199
A39	16-20	200-201
A40	21-25	202-203
A41	26-30	204-205
N18	31-35	206-207
A42	36-40	208-209
A43	41-45	210-211
PS	46	

Pretest

Multiply.

1. 0.07 $\times 6$ <u>0.42</u>	2. 0.09 $\times 3$ <u>0.27</u>	3. 0.14 $\times 5$ <u>0.70</u>	4. 0.72 $\times 8$ <u>5.76</u>	5. 0.96 $\times 3$ <u>2.88</u>
6. 7.51 $\times 3$ <u>22.53</u>	7. 6.42 $\times 5$ <u>32.10</u>	8. 8.03 $\times 9$ <u>72.27</u>	9. 7.46 $\times 3$ <u>22.38</u>	10. 9.05 $\times 2$ <u>18.10</u>
11. 3 $\times 0.9$ <u>2.7</u>	12. 8 $\times 0.5$ <u>4.0</u>	13. 45 $\times 0.7$ <u>31.5</u>	14. 92 $\times 0.5$ <u>46.0</u>	15. 186 $\times 0.8$ <u>148.8</u>
16. 0.5 $\times 0.6$ <u>0.30</u>	17. 0.9 $\times 0.4$ <u>0.36</u>	18. 0.8 $\times 0.7$ <u>0.56</u>	19. 0.5 $\times 0.5$ <u>0.25</u>	20. 0.1 $\times 0.6$ <u>0.06</u>

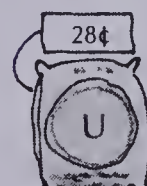
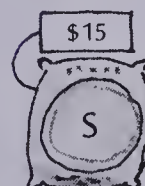
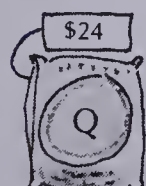
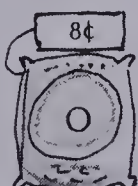
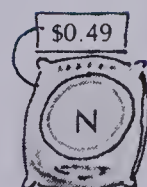
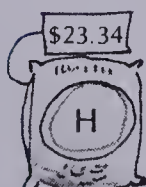
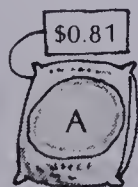
Unit 9

Planting Puzzle



Answer the questions and use the code to find out what two vegetables the farmer is planting

1. $3 \times \$5$ ^S **\$15**
2. $4 \times \$6.00$ ^Q **\$24**
3. $7 \times 4¢$ ^U **28¢**
4. $9 \times \$0.09$ ^A **\$0.81**
5. $4 \times \$3.75$ ^S **\$15**
6. $6 \times \$3.89$ ^H **\$23.34**
7. $24¢ \div 3$ ^O **8¢**
8. $\$0.98 \div 2$ ^N **\$0.49**
9. $\$8.16 \div 8$ ^I **\$1.02**
10. $\$0.72 \div 9$ ^O **8¢**
11. $\$3.92 \div 8$ ^N **\$0.49**
12. $\$75.00 \div 5$ ^S **\$15**



193

UNIT 9

PREVIEW

Suggestions

Use the illustration on page 192 to discuss how decimals are used in farming. Have the students guess the capacity of the bucket in litres. Point out the gas pump gauge which can be used to tell the number of litres used. Have the students illustrate the size of a cubic metre. Ask them to approximate the amount of hay (in cubic metres) that the barn or pick-up truck would hold.

About the Page

Page 193 reviews the previously learned skills of multiplying and dividing with money. Lesson 8 of Unit 3, pages 64 and 65, and Lesson 4 of Unit 6, pages 128 and 129, deal with the multiplication of money. Lesson 9 of Unit 4, pages 90 and 91, deals with the division of money. Since computation with money is of a practical nature and easy for students to understand, it is a good starting point for multiplying and dividing with decimals.

See whether the students understand the two ways that amounts of money can be written by asking them to record the following amounts of money with a dollar sign and cents point: 25¢, 3¢, 86¢, 124¢, 9¢, and 205¢. Point out, also, that an even amount of dollars can be written with or without the decimal point, e.g., \$5, or \$5.00.

Note that there are examples of both multiplication and division on page 193. When the problems have been answered, the student can check his or her work by decoding the names of two vegetables (squash and onions).

Reinforcement

Cut out the descriptions and costs of various items from a plant and seed catalog. Attach these to individual cards with questions requiring multiplication or division.

3 lily bulbs \$2.58

What is the cost of one bulb?

21. $\begin{array}{r} 5.2 \\ \times 0.9 \\ \hline 4.68 \end{array}$
 22. $\begin{array}{r} 8.6 \\ \times 0.3 \\ \hline 2.58 \end{array}$
 23. $\begin{array}{r} 3.4 \\ \times 0.5 \\ \hline 1.70 \end{array}$
 24. $\begin{array}{r} 32.8 \\ \times 0.2 \\ \hline 6.56 \end{array}$
 25. $\begin{array}{r} 46.5 \\ \times 0.1 \\ \hline 4.65 \end{array}$
 26. $\begin{array}{r} 8.7 \\ \times 1.6 \\ \hline 13.92 \end{array}$
 27. $\begin{array}{r} 4.3 \\ \times 4.9 \\ \hline 21.07 \end{array}$
 28. $\begin{array}{r} 2.7 \\ \times 8.6 \\ \hline 23.22 \end{array}$
 29. $\begin{array}{r} 9.7 \\ \times 5.3 \\ \hline 51.41 \end{array}$
 30. $\begin{array}{r} 23.5 \\ \times 1.2 \\ \hline 28.20 \end{array}$
- Round to the nearest tenth.
31. $\begin{array}{r} 3.24 \\ \div 1.3 \\ \hline 3.2 \end{array}$
 32. $\begin{array}{r} 8.95 \\ \div 1.9 \\ \hline 9.0 \end{array}$
 33. $\begin{array}{r} 6.88 \\ \div 1.3 \\ \hline 6.9 \end{array}$
 34. $\begin{array}{r} 12.41 \\ \div 1.3 \\ \hline 12.4 \end{array}$
 35. $\begin{array}{r} 29.37 \\ \div 1.36 \\ \hline 29.4 \end{array}$
 36. $\begin{array}{r} 2 \overline{)26} \\ \underline{20} \\ 6 \end{array}$
 37. $\begin{array}{r} 3 \overline{)5.7} \\ \underline{9} \\ 0 \end{array}$
 38. $\begin{array}{r} 9 \overline{)11.7} \\ \underline{9} \\ 0 \end{array}$
 39. $\begin{array}{r} 7 \overline{)63.56} \\ \underline{49} \\ 14.56 \\ \underline{14} \\ 0.56 \\ \underline{0.56} \\ 0 \end{array}$
 40. $\begin{array}{r} 9 \overline{)12.24} \\ \underline{9} \\ 3.24 \\ \underline{27} \\ 0.54 \\ \underline{0.54} \\ 0 \end{array}$
- Write as a decimal.
41. $\frac{3}{4}$ **0.75**
 42. $\frac{1}{2}$ **0.5**
 43. $\frac{9}{10}$ **0.9**
 44. $\frac{3}{25}$ **0.12**
 45. $\frac{1}{50}$ **0.02**
- Solve.
46. A 5 kg bag of bird seed costs \$12.98. What is the cost of 1 kg? **\$2.60**

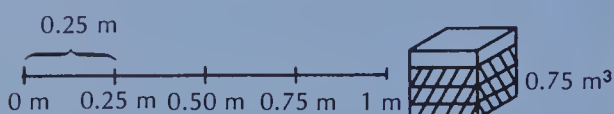
UNIT 9 LESSON 1

Objective A36

Multiply a decimal less than one in hundredths by a whole number.

Introducing the Lesson

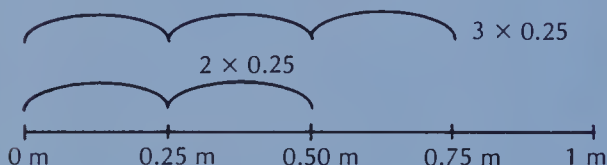
Write 0.25 m and 0.75 m³ on the chalkboard and help the students visualize their meanings with illustrations and discussion. See that it is understood that each represents an amount that is part of a whole.



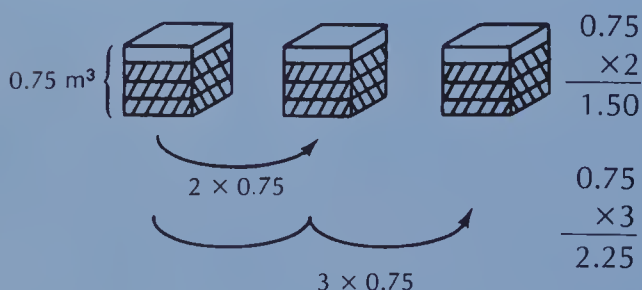
Teaching the Lesson

Ask, "How long is 0.25 m doubled? tripled?" Use the above illustration to help the students visualize the answers. Then record the corresponding multiplications on the chalkboard. Point out that the number of decimal places in the two factors is equal to the number of decimal places in the product.

$$\begin{array}{r} 0.25 \\ \times 2 \\ \hline 0.50 \end{array} \quad \begin{array}{r} 0.25 \\ \times 3 \\ \hline 0.75 \end{array} \left. \begin{array}{l} \\ \end{array} \right\} \begin{array}{l} 2 \text{ decimal places} \\ 2 \text{ decimal places} \end{array}$$



Ask "How much is 0.75 m³ of soil doubled? tripled?" Use an illustration so the students can visualize the problem and then record the multiplications on the chalkboard. Discuss the position of the decimal point in the product.



Read and discuss the problem at the top of page 194. Recall the relationship 1000 kg = 1 t. Show how the number line can be used to illustrate the problem. Then explain the multiplication algorithm and stress the number of decimal places in the product.

Multiplying Hundredths

A cubic metre of wheat has a mass of 0.75 t. Mr. Milosz has 9 m³ of wheat in his truck. What is the mass of the wheat?



Look at the number line. Put the decimal point in the answer.

Multiply.

$$\begin{array}{r} 0.75 \\ \times 9 \\ \hline 6.75 \end{array}$$

The mass of the wheat is 6.75 t.

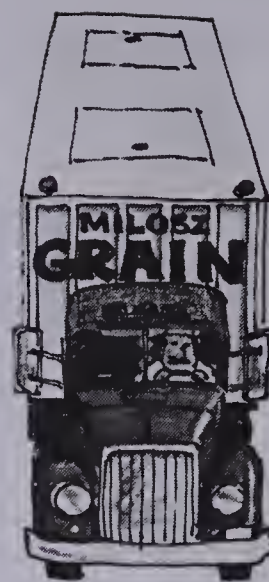
Count the decimal places in the factors.

0.75

Count the decimal places in the product.

$$\begin{array}{r} 0.75 \\ \times 9 \\ \hline 6.75 \end{array}$$

These counts should be equal.



EXERCISES

Multiply.

- | | | | | |
|--|--|--|--|--|
| 1. $\begin{array}{r} 32 \\ \times 3 \\ \hline 96 \end{array}$ | 2. $\begin{array}{r} 3.2 \\ \times 3 \\ \hline 9.6 \end{array}$ | 3. $\begin{array}{r} 0.32 \\ \times 3 \\ \hline 0.96 \end{array}$ | 4. $\begin{array}{r} 14 \\ \times 4 \\ \hline 56 \end{array}$ | 5. $\begin{array}{r} 1.4 \\ \times 4 \\ \hline 5.6 \end{array}$ |
| 6. $\begin{array}{r} 0.14 \\ \times 4 \\ \hline 0.56 \end{array}$ | 7. $\begin{array}{r} 93 \\ \times 5 \\ \hline 465 \end{array}$ | 8. $\begin{array}{r} 9.3 \\ \times 5 \\ \hline 46.5 \end{array}$ | 9. $\begin{array}{r} 0.93 \\ \times 5 \\ \hline 4.65 \end{array}$ | 10. $\begin{array}{r} 0.37 \\ \times 6 \\ \hline 2.22 \end{array}$ |
| 11. $\begin{array}{r} 0.49 \\ \times 7 \\ \hline 3.43 \end{array}$ | 12. $\begin{array}{r} 0.72 \\ \times 9 \\ \hline 6.48 \end{array}$ | 13. $\begin{array}{r} 0.18 \\ \times 4 \\ \hline 0.72 \end{array}$ | 14. $\begin{array}{r} 0.26 \\ \times 5 \\ \hline 1.30 \end{array}$ | 15. $\begin{array}{r} 0.53 \\ \times 8 \\ \hline 4.24 \end{array}$ |

Using the Exercises

- Questions 1 to 9 are in groups of three. In each group, the digits stay the same, but their place value changes. Students must know that the number of decimal places in the product must be the same as that in the factors to complete these questions successfully.
- Questions 10 to 15 involve multiplying hundredths by a whole number.

PRACTICE

Copy the question. Put the decimal point in the answer.

- | | | | | |
|--|--|--|--|--|
| 1. 0.03×2
$\begin{array}{r} 0.03 \\ \times 2 \\ \hline 006 \end{array}$
↑ | 2. 0.14×2
$\begin{array}{r} 0.14 \\ \times 2 \\ \hline 028 \end{array}$
↑ | 3. 0.46×5
$\begin{array}{r} 0.46 \\ \times 5 \\ \hline 230 \end{array}$
↑ | 4. 0.78×6
$\begin{array}{r} 0.78 \\ \times 6 \\ \hline 468 \end{array}$
↑ | 5. 0.92×8
$\begin{array}{r} 0.92 \\ \times 8 \\ \hline 736 \end{array}$
↑ |
|--|--|--|--|--|

Find the product.

- | | | | | |
|---|--|---|--|---|
| 6. 0.08×6
$\begin{array}{r} 0.08 \\ \times 6 \\ \hline 0.48 \end{array}$ | 7. 0.42×8
$\begin{array}{r} 0.42 \\ \times 8 \\ \hline 3.36 \end{array}$ | 8. 0.66×4
$\begin{array}{r} 0.66 \\ \times 4 \\ \hline 2.64 \end{array}$ | 9. 0.49×7
$\begin{array}{r} 0.49 \\ \times 7 \\ \hline 3.43 \end{array}$ | 10. 0.97×5
$\begin{array}{r} 0.97 \\ \times 5 \\ \hline 4.85 \end{array}$ |
| 11. 0.04×4
$\begin{array}{r} 0.04 \\ \times 4 \\ \hline 0.16 \end{array}$ | 12. 0.26×5
$\begin{array}{r} 0.26 \\ \times 5 \\ \hline 1.30 \end{array}$ | 13. 0.54×7
$\begin{array}{r} 0.54 \\ \times 7 \\ \hline 3.78 \end{array}$ | 14. 0.85×3
$\begin{array}{r} 0.85 \\ \times 3 \\ \hline 2.55 \end{array}$ | 15. 0.68×6
$\begin{array}{r} 0.68 \\ \times 6 \\ \hline 4.08 \end{array}$ |
| 16. 0.76×8
$\begin{array}{r} 0.76 \\ \times 8 \\ \hline 6.08 \end{array}$ | 17. 0.18×88
$\begin{array}{r} 0.18 \\ \times 88 \\ \hline 15.84 \end{array}$ | 18. 5.9×9
$\begin{array}{r} 5.9 \\ \times 9 \\ \hline 53.1 \end{array}$ | 19. 0.81×62
$\begin{array}{r} 0.81 \\ \times 62 \\ \hline 50.22 \end{array}$ | 20. 9.9×7
$\begin{array}{r} 9.9 \\ \times 7 \\ \hline 69.3 \end{array}$ |

Solve.

21. A cubic metre of oats has a mass of 0.42 t. Spence's truck holds 32 m³. What is the mass of a full load?
13.44 t
22. The Chungs grow cauliflower to sell. Last summer they got \$0.54 for each kilogram. How much did they get for 95 kg?
\$51.30
23. Mrs. Vanderwal must hire a truck to ship cattle from her farm. A cattle truck will carry 16 000 kg. If she has 29 cattle with a mass of about 0.55 t each, will she have to hire more than one truck?
No

Share Cropping

A small field has 8 trees planted around it as shown. Divide the field into 2 congruent parts so that there are 4 trees in each part.



195

Assigning the Practice

Minimum: 1-21

Average: 3-23

Enriched: 3-23

Reinforcement

1. Provide the students with a worksheet of number lines. The number lines should go from 0 to 5. The space between the whole numbers should be divided into fourths. Then have the students illustrate the following multiplication questions on the number lines before they record the algorithm.

$$9 \times 0.25 = 2.25$$



- | | |
|--------------------|--------------------|
| a. 6×0.50 | b. 3×0.75 |
| c. 7×0.25 | d. 9×0.50 |
| e. 5×0.75 | f. 8×0.25 |

2. Play the following game. Label one die: 0.25, 0.50, 0.10, 0.20, 0.30, and 0.40. Label another die: 2, 3, 4, 5, 6 and 7. In turn, players roll the two dice and mentally multiply the numbers that are shown. The other players check the responses by using paper and pencil. Each correct answer receives a point. The first player to get 10 points wins.

Enrichment

1. Assign *Share Cropping* at the bottom of page 195. Have the students trace the figure and then cut it into two congruent parts. There are several solutions. Display them so that the students can test the congruence of each.

2. Have the students complete the following relationship equations.

- | | |
|------------------|--|
| a. 1 t = ____ kg | b. 1 m ³ = ____ dm ³ |
| 1 t = ____ g | 1 m ³ = ____ cm ³ |

Extra Practice

Multiply.

- | | | | |
|---|---|---|--|
| 1. 0.06×4
$\begin{array}{r} 0.06 \\ \times 4 \\ \hline 0.24 \end{array}$ | 2. 0.52×3
$\begin{array}{r} 0.52 \\ \times 3 \\ \hline 1.56 \end{array}$ | 3. 0.59×7
$\begin{array}{r} 0.59 \\ \times 7 \\ \hline 4.13 \end{array}$ | 4. 0.03×12
$\begin{array}{r} 0.03 \\ \times 12 \\ \hline 0.36 \end{array}$ |
| 5. 0.45×63
$\begin{array}{r} 0.45 \\ \times 63 \\ \hline 28.35 \end{array}$ | 6. 0.77×89
$\begin{array}{r} 0.77 \\ \times 89 \\ \hline 68.53 \end{array}$ | 7. 0.72×18
$\begin{array}{r} 0.72 \\ \times 18 \\ \hline 12.96 \end{array}$ | 8. 0.38×9
$\begin{array}{r} 0.38 \\ \times 9 \\ \hline 3.42 \end{array}$ |
| 9. 0.83×52
$\begin{array}{r} 0.83 \\ \times 52 \\ \hline 43.16 \end{array}$ | 10. 0.61×3
$\begin{array}{r} 0.61 \\ \times 3 \\ \hline 1.83 \end{array}$ | 11. 0.45×15
$\begin{array}{r} 0.45 \\ \times 15 \\ \hline 6.75 \end{array}$ | 12. 0.92×26
$\begin{array}{r} 0.92 \\ \times 26 \\ \hline 23.92 \end{array}$ |

Solve.

13. A farmer receives \$0.11 a kilogram for potatoes. How much does he get for 60 kg of potatoes?
\$6.60

Worksheet A36

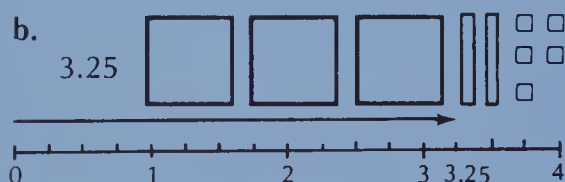
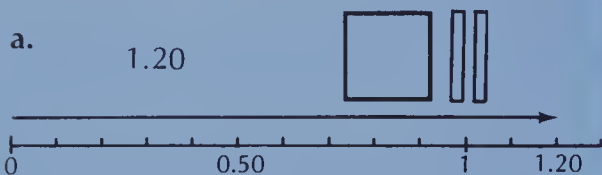
Pages 194-195

Objective A37

Multiply a decimal greater than one in hundredths by a whole number.

Introducing the Lesson

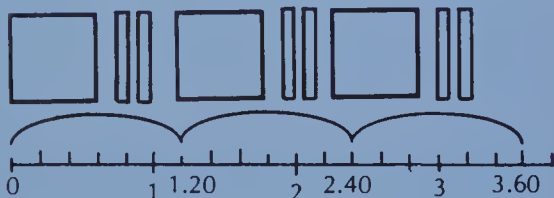
Review the place value and meaning of decimals greater than one in hundredths. Write several decimals on the chalkboard similar to the following. Ask the students to model them with place-value blocks and with number lines.



Teaching the Lesson

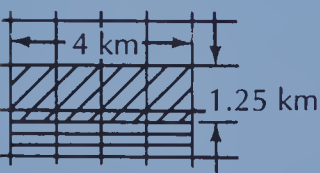
Ask the students to double or triple the above decimals in hundredths using the place-value blocks and number lines. Then record the multiplication algorithm and point out the number of decimal places in the product.

$$3 \times 1.20 = 3.60$$



$$\begin{array}{r} 1.20 \\ \times 3 \\ \hline 3.60 \end{array}$$

Illustrate the lengths and widths of a farm as shown below using a graph paper transparency on an overhead projector. Have the students count the squares to find the area of the farm. Then ask them to use the multiplication algorithm to find the area.



$$\begin{array}{r} 1.25 \\ \times 4 \\ \hline 5.00 \text{ km}^2 \end{array}$$

Read and discuss the problem at the top of page 196. Point out that \$3.25 was rounded to the nearest dollar so that a reasonable product could be estimated.

Multiplying Hundredths

A vegetable farmer sells lettuce to a wholesaler for \$3.25 for each crate. How much does she receive for 8 crates?



Multiply.	Estimate.	Put the decimal point in the answer.
$\begin{array}{r} \$3.25 \\ \times 8 \\ \hline \end{array}$	$8 \times 3 = 24$	$\begin{array}{r} \$3.25 \\ \times 8 \\ \hline \$26.00 \end{array}$

She receives \$26.00 for 8 crates.

Count the decimal places.

\$3.25	2 decimal places in the factors
$\times 8$	
\$26.00	2 decimal places in the product

EXERCISES

Multiply.

1. $\begin{array}{r} 143 \\ \times 2 \\ \hline 286 \end{array}$	2. $\begin{array}{r} 14.3 \\ \times 2 \\ \hline 28.6 \end{array}$	3. $\begin{array}{r} 1.43 \\ \times 2 \\ \hline 2.86 \end{array}$	4. $\begin{array}{r} 526 \\ \times 5 \\ \hline 2630 \end{array}$	5. $\begin{array}{r} 52.6 \\ \times 5 \\ \hline 263.0 \end{array}$
6. $\begin{array}{r} 5.26 \\ \times 5 \\ \hline 26.30 \end{array}$	7. $\begin{array}{r} 408 \\ \times 7 \\ \hline 2856 \end{array}$	8. $\begin{array}{r} 40.8 \\ \times 7 \\ \hline 285.6 \end{array}$	9. $\begin{array}{r} 4.08 \\ \times 7 \\ \hline 28.56 \end{array}$	10. $\begin{array}{r} 365 \\ \times 8 \\ \hline 2920 \end{array}$
11. $\begin{array}{r} 36.5 \\ \times 8 \\ \hline 292.0 \end{array}$	12. $\begin{array}{r} 3.65 \\ \times 8 \\ \hline 29.20 \end{array}$	13. $\begin{array}{r} 5.67 \\ \times 4 \\ \hline 22.68 \end{array}$	14. $\begin{array}{r} 7.49 \\ \times 5 \\ \hline 37.45 \end{array}$	15. $\begin{array}{r} 8.36 \\ \times 9 \\ \hline 75.24 \end{array}$
16. $\begin{array}{r} 8.36 \\ \times 49 \\ \hline 409.64 \end{array}$	17. $\begin{array}{r} 1.76 \\ \times 7 \\ \hline 12.32 \end{array}$	18. $\begin{array}{r} 1.76 \\ \times 57 \\ \hline 100.32 \end{array}$	19. $\begin{array}{r} 2.09 \\ \times 3 \\ \hline 6.27 \end{array}$	20. $\begin{array}{r} 2.09 \\ \times 63 \\ \hline 131.67 \end{array}$

Using the Exercises

- Questions 1 to 12 are in sets of three and encourage the students to concentrate on the placement of the decimal point in the product.
- Questions 13 to 20 lead the students by stages into multiplying a decimal in hundredths by a two-digit whole number.

PRACTICE

Copy the question. Put the decimal point in the answer.

$$\begin{array}{r} 1. \quad 3.01 \\ \times 2 \\ \hline 602 \end{array}$$

$$\begin{array}{r} 2. \quad 4.13 \\ \times 5 \\ \hline 2065 \end{array}$$

$$\begin{array}{r} 3. \quad 6.43 \\ \times 6 \\ \hline 3858 \end{array}$$

$$\begin{array}{r} 4. \quad 7.59 \\ \times 4 \\ \hline 3036 \end{array}$$

$$\begin{array}{r} 5. \quad 8.38 \\ \times 8 \\ \hline 6704 \end{array}$$

Find the product.

$$\begin{array}{r} 6. \quad 2.03 \\ \times 3 \\ \hline 6.09 \end{array}$$

$$\begin{array}{r} 7. \quad 4.01 \\ \times 4 \\ \hline 16.04 \end{array}$$

$$\begin{array}{r} 8. \quad 5.55 \\ \times 6 \\ \hline 33.30 \end{array}$$

$$\begin{array}{r} 9. \quad 9.35 \\ \times 7 \\ \hline 65.45 \end{array}$$

$$\begin{array}{r} 10. \quad 9.78 \\ \times 9 \\ \hline 88.02 \end{array}$$

$$\begin{array}{r} 11. \quad 1.04 \\ \times 15 \\ \hline 15.60 \end{array}$$

$$\begin{array}{r} 12. \quad 3.15 \\ \times 32 \\ \hline 100.80 \end{array}$$

$$\begin{array}{r} 13. \quad 5.26 \\ \times 41 \\ \hline 215.66 \end{array}$$

$$\begin{array}{r} 14. \quad 6.39 \\ \times 66 \\ \hline 421.74 \end{array}$$

$$\begin{array}{r} 15. \quad 8.25 \\ \times 48 \\ \hline 396.00 \end{array}$$

$$\begin{array}{r} 16. \quad 2.89 \\ \times 13 \\ \hline 37.57 \end{array}$$

$$\begin{array}{r} 17. \quad 50.4 \\ \times 57 \\ \hline 2872.8 \end{array}$$

$$\begin{array}{r} 18. \quad 87.5 \\ \times 60 \\ \hline 5250.0 \end{array}$$

$$\begin{array}{r} 19. \quad 9.69 \\ \times 37 \\ \hline 358.53 \end{array}$$

$$\begin{array}{r} 20. \quad 90.1 \\ \times 89 \\ \hline 8018.9 \end{array}$$

Solve.

21. Hogs sell for \$1.48/kg. How much would a 75 kg animal sell for?

\$111.00

22. A hectare of orchard can yield 8.96 t of Bartlett pears. The Swensons have 15 hectares (ha) of Bartlett pears. What yield can they expect?

134.4 t

Computer Tutor

IN	OUT	IN	OUT	IN	OUT
7	44	3	20	4	58
9	56	4	25	7	94
12	74	7	40	9	118
15	92	8	45	10	130
50	302	11	60	12	154

197

Assigning the Practice

Minimum: 1-21

Average: 3-22

Enriched: 3-22

Reinforcement

1. Have the students model the following multiplications with place-value blocks or number lines as in the lesson.

- a. 2.40×2 b. 7.25×3
c. 4.10×4 d. 9.75×2

2. Give the students centimetre grid paper. Have them draw rectangles with the following dimensions. Then ask them to find the areas.

- a. length 6.50 cm, width 4 cm
b. length 5 cm, width 3.75 cm
c. length 9 cm, width 2.50 cm
d. length 8.25 cm, width 8 cm

3. Obtain menu order forms from fast food restaurants. Have the students compute the costs of several orders.

Enrichment

1. Assign Computer Tutor at the bottom of page 197. See if the students can devise other examples like these for the rest of the class to solve.

2. Have the students complete most of the following *without multiplying*. Use patterns instead.

- a. $99.9 \times 2 =$ b. $9.99 \times 2 =$
 $99.9 \times 3 =$ $9.99 \times 3 =$
 $99.9 \times 4 =$ $9.99 \times 4 =$
 $99.9 \times 5 =$ $9.99 \times 5 =$
 $99.9 \times 6 =$ $9.99 \times 6 =$

Ask the students to extend the patterns further.

Extra Practice

Find the product.

$$\begin{array}{r} 1. \quad 3.08 \\ \times 5 \\ \hline 15.40 \end{array}$$

$$\begin{array}{r} 2. \quad 6.39 \\ \times 8 \\ \hline 51.12 \end{array}$$

$$\begin{array}{r} 3. \quad 8.65 \\ \times 7 \\ \hline 60.55 \end{array}$$

$$\begin{array}{r} 4. \quad 2.13 \\ \times 16 \\ \hline 34.08 \end{array}$$

$$\begin{array}{r} 5. \quad 5.36 \\ \times 46 \\ \hline 246.56 \end{array}$$

$$\begin{array}{r} 6. \quad 9.74 \\ \times 59 \\ \hline 574.66 \end{array}$$

$$\begin{array}{r} 7. \quad 4.33 \\ \times 67 \\ \hline 290.11 \end{array}$$

$$\begin{array}{r} 8. \quad 8.37 \\ \times 9 \\ \hline 75.33 \end{array}$$

$$\begin{array}{r} 9. \quad 6.25 \\ \times 44 \\ \hline 275.00 \end{array}$$

$$\begin{array}{r} 10. \quad 0.19 \\ \times 42 \\ \hline 7.98 \end{array}$$

$$\begin{array}{r} 11. \quad 1.48 \\ \times 6 \\ \hline 8.88 \end{array}$$

$$\begin{array}{r} 12. \quad 5.55 \\ \times 5 \\ \hline 27.75 \end{array}$$

Solve.

13. A hired man is paid \$6.25 an hour. How much will he earn for a 40 h week?

\$250.00

Worksheet A37

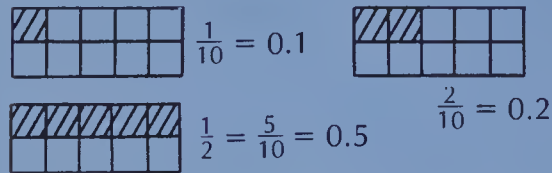
Pages 196-197

Objective A38

Multiply a whole number by a decimal in tenths.

Introducing the Lesson

Review fraction and decimal equivalents from Lesson 8 of Unit 7, pages 160 and 161.



Also review fractional parts of a set (Lessons 2 and 3, Unit 7, pages 148 to 151) and show how these can be useful when multiplying with decimals in tenths.

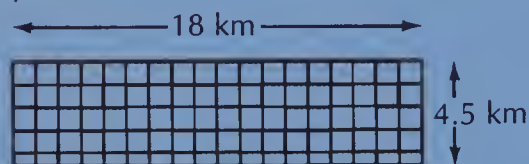
$$0.1 \times 10 \rightarrow \left(\frac{1}{10} \times 10 \right) \rightarrow = 1$$

$$0.5 \times 16 \rightarrow \left(\frac{1}{2} \times 16 \right) \rightarrow = 8$$

Teaching the Lesson

Read and discuss the problem at the top of page 198. Have the students name the fraction equivalent to 0.5. Show how this was used to estimate the reasonableness of the product.

Have the students estimate the area of the following rectangular field by rounding the decimal to the nearest whole number. Illustrate the situation with an overhead transparency. Then have the students use the multiplication algorithm and match their product to the estimate. Discuss, also, the number of decimal places in the product.



Estimate	Calculate	
$\begin{array}{r} 18 \\ \times 5 \\ \hline 90 \text{ km}^2 \end{array}$	$\begin{array}{r} 18 \\ \times 4.5 \\ \hline 90 \\ 72 \\ \hline 81.0 \text{ km}^2 \end{array}$	$\left. \begin{array}{l} \\ \end{array} \right\} 1 \text{ decimal place}$

Have the students first estimate the mass of 8 bags of apples at 1.2 kg per bag. Then use a number line to illustrate the situation. Have a student record the multiplication algorithm on the chalkboard.

Multiplying by Tenths

A poultry farmer has 775 chickens. He gives each chicken 0.5 L of water every day. How much water does he need for all his chickens each day?



	Multiply	Estimate.	Put the decimal point in the answer
$\begin{array}{r} 775 \\ \times 0.5 \\ \hline \end{array}$	$\begin{array}{r} 775 \\ \times 0.5 \\ \hline 3875 \end{array}$	$\frac{1}{2} \text{ of } 800 = 400$	$\begin{array}{r} 775 \\ \times 0.5 \\ \hline 387.5 \end{array}$

One decimal place in the factors $\left\{ \begin{array}{r} 775 \\ \times 0.5 \\ \hline \end{array} \right.$

One decimal place in the product $\left\{ \begin{array}{r} 387.5 \end{array} \right.$

EXERCISES

Multiply.

1. $\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$	2. $\begin{array}{r} 5 \\ \times 0.5 \\ \hline 2.5 \end{array}$	3. $\begin{array}{r} 20 \\ \times 0.5 \\ \hline 10.0 \end{array}$	4. $\begin{array}{r} 25 \\ \times 0.5 \\ \hline 12.5 \end{array}$	5. $\begin{array}{r} 125 \\ \times 0.5 \\ \hline 62.5 \end{array}$
6. $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$	7. $\begin{array}{r} 8 \\ \times 0.7 \\ \hline 5.6 \end{array}$	8. $\begin{array}{r} 30 \\ \times 0.7 \\ \hline 21.0 \end{array}$	9. $\begin{array}{r} 38 \\ \times 0.7 \\ \hline 26.6 \end{array}$	10. $\begin{array}{r} 338 \\ \times 0.7 \\ \hline 236.6 \end{array}$
11. $\begin{array}{r} 24 \\ \times 0.2 \\ \hline 4.8 \end{array}$	12. $\begin{array}{r} 24 \\ \times 12 \\ \hline 288 \end{array}$	13. $\begin{array}{r} 24 \\ \times 1.2 \\ \hline 28.8 \end{array}$	14. $\begin{array}{r} 124 \\ \times 1.2 \\ \hline 148.8 \end{array}$	15. $\begin{array}{r} 324 \\ \times 1.2 \\ \hline 388.8 \end{array}$
16. $\begin{array}{r} 23 \\ \times 0.6 \\ \hline 13.8 \end{array}$	17. $\begin{array}{r} 52 \\ \times 0.9 \\ \hline 46.8 \end{array}$	18. $\begin{array}{r} 37 \\ \times 1.5 \\ \hline 55.5 \end{array}$	19. $\begin{array}{r} 81 \\ \times 2.9 \\ \hline 234.9 \end{array}$	20. $\begin{array}{r} 35 \\ \times 6.7 \\ \hline 234.5 \end{array}$
21. $\begin{array}{r} 39 \\ \times 0.7 \\ \hline 27.3 \end{array}$	22. $\begin{array}{r} 43 \\ \times 5.2 \\ \hline 223.6 \end{array}$	23. $\begin{array}{r} 66 \\ \times 7.4 \\ \hline 488.4 \end{array}$	24. $\begin{array}{r} 27 \\ \times 9.6 \\ \hline 259.2 \end{array}$	25. $\begin{array}{r} 75 \\ \times 5.8 \\ \hline 435.0 \end{array}$

Using the Exercises

- Questions 1 to 15 are sequentially developed. Discuss and compare the products in each row.
- Questions 16 to 25 provide practice with multiplying a two-digit whole number by a decimal in tenths.

PRACTICE

Copy the question. Put the decimal point in the answer.

1. $\begin{array}{r} 7 \\ \times 0.5 \\ \hline 35 \\ \uparrow \end{array}$	2. $\begin{array}{r} 8 \\ \times 0.7 \\ \hline 56 \\ \uparrow \end{array}$	3. $\begin{array}{r} 24 \\ \times 0.2 \\ \hline 48 \\ \uparrow \end{array}$	4. $\begin{array}{r} 80 \\ \times 0.9 \\ \hline 720 \\ \uparrow \end{array}$	5. $\begin{array}{r} 37 \\ \times 2.3 \\ \hline 851 \\ \uparrow \end{array}$
--	--	---	--	--

Find the product.

6. $\begin{array}{r} 2 \\ \times 0.4 \\ \hline 0.8 \end{array}$	7. $\begin{array}{r} 34 \\ \times 0.6 \\ \hline 204 \end{array}$	8. $\begin{array}{r} 55 \\ \times 0.8 \\ \hline 44.0 \end{array}$	9. $\begin{array}{r} 10 \\ \times 0.1 \\ \hline 1.0 \end{array}$	10. $\begin{array}{r} 60 \\ \times 0.5 \\ \hline 30.0 \end{array}$
11. $\begin{array}{r} 2 \\ \times 1.3 \\ \hline 2.6 \end{array}$	12. $\begin{array}{r} 31 \\ \times 2.5 \\ \hline 77.5 \end{array}$	13. $\begin{array}{r} 22 \\ \times 4.5 \\ \hline 99.0 \end{array}$	14. $\begin{array}{r} 134 \\ \times 6.1 \\ \hline 817.4 \end{array}$	15. $\begin{array}{r} 255 \\ \times 8.4 \\ \hline 2142.0 \end{array}$
16. $\begin{array}{r} 77 \\ \times 0.3 \\ \hline 23.1 \end{array}$	17. $\begin{array}{r} 232 \\ \times 0.6 \\ \hline 139.2 \end{array}$	18. $\begin{array}{r} 455 \\ \times 0.8 \\ \hline 364.0 \end{array}$	19. $\begin{array}{r} 238 \\ \times 0.9 \\ \hline 214.2 \end{array}$	20. $\begin{array}{r} 4532 \\ \times 0.7 \\ \hline 3172.4 \end{array}$

Solve.

21. The Bensons have a cherry orchard. Its area is 8 hectares (ha). Each hectare yields about 4.8 t of cherries. How many tonnes will the whole orchard yield? **38.4 t**
22. The Mishkos cherry orchard yielded 48 t. They sold nine tenths of the cherries to the cannery and the rest to the market. How much did they sell to the market? **4.8 t**

USING THE CALCULATOR

Use a calculator to multiply these.

1. $\begin{array}{r} 333 \\ \times 2.9 \\ \hline 965.7 \end{array}$	2. $\begin{array}{r} 333 \\ \times 0.29 \\ \hline 96.57 \end{array}$	3. $\begin{array}{r} 33.3 \\ \times 2.9 \\ \hline 96.57 \end{array}$	4. $\begin{array}{r} 33.3 \\ \times 29 \\ \hline 965.7 \end{array}$	5. $\begin{array}{r} 3.33 \\ \times 29 \\ \hline 96.57 \end{array}$
6. $\begin{array}{r} 27.8 \\ \times 1.4 \\ \hline 38.92 \end{array}$	7. $\begin{array}{r} 14.5 \\ \times 7.4 \\ \hline 107.3 \end{array}$	8. $\begin{array}{r} 16.3 \\ \times 11.8 \\ \hline 192.34 \end{array}$	9. $\begin{array}{r} 43.2 \\ \times 21.9 \\ \hline 946.08 \end{array}$	10. $\begin{array}{r} 7.6 \\ \times 8.7 \\ \hline 66.12 \end{array}$

11. Write a rule for finding the number of decimal places in the answer. **It is the same as the total number in the problem.** 199

Assigning the Practice

Minimum: 1-21

Average: 3-22

Enriched: 3-22

Reinforcement

- Ask the students to illustrate the first three multiplications in the Practice section on page 199 using a number line.
- Prepare a deck of cards labelled with pairs of factors and products similar to the following.

$\begin{array}{r} 15 \\ \times 0.3 \\ \hline \end{array}$	4.5	$\begin{array}{r} 60 \\ \times 1.1 \\ \hline \end{array}$	66
$\begin{array}{r} 12 \\ \times 1.2 \\ \hline \end{array}$	14.4	$\begin{array}{r} 10 \\ \times 2.5 \\ \hline \end{array}$	25

Use the cards to play Concentration or Fish.

Enrichment

- Assign *Using the Calculator* at the bottom of page 199.
- Ask the students to fill in the missing factors.
 - $6 \times \underline{\quad} = 7.2$
 - $5 \times \underline{\quad} = 0.55$
 - $2 \times \underline{\quad} = 3$
 - $4 \times \underline{\quad} = 1$
 - $3 \times \underline{\quad} = 0.36$
 - $2 \times \underline{\quad} = 2.6$
 - $5 \times \underline{\quad} = 0.5$
 - $3 \times \underline{\quad} = 0.45$

Extra Practice

Worksheet A38

Pages 198-199

Find the product.

1. $\begin{array}{r} 16 \\ \times 0.3 \\ \hline 4.8 \end{array}$	2. $\begin{array}{r} 28 \\ \times 1.3 \\ \hline 36.4 \end{array}$	3. $\begin{array}{r} 9 \\ \times 0.7 \\ \hline 6.3 \end{array}$	4. $\begin{array}{r} 27 \\ \times 0.8 \\ \hline 21.6 \end{array}$	5. $\begin{array}{r} 35 \\ \times 1.5 \\ \hline 52.5 \end{array}$	6. $\begin{array}{r} 48 \\ \times 0.9 \\ \hline 43.2 \end{array}$
7. $\begin{array}{r} 94 \\ \times 7.6 \\ \hline 714.4 \end{array}$	8. $\begin{array}{r} 8 \\ \times 6.3 \\ \hline 50.4 \end{array}$	9. $\begin{array}{r} 66 \\ \times 0.9 \\ \hline 59.4 \end{array}$	10. $\begin{array}{r} 142 \\ \times 0.8 \\ \hline 113.6 \end{array}$	11. $\begin{array}{r} 275 \\ \times 1.5 \\ \hline 412.5 \end{array}$	12. $\begin{array}{r} 4782 \\ \times 0.7 \\ \hline 3347.4 \end{array}$

Solve.

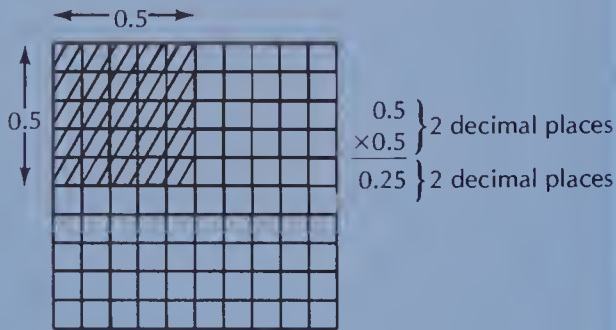
13. Jason can run a kilometre in 4.5 min. If he could keep up that pace, how long would it take him to run 5 km? **22.5 min**

Objective A39

Multiply a decimal less than one in tenths by another decimal in the same form.

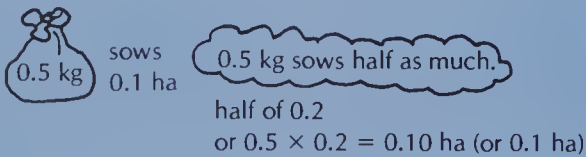
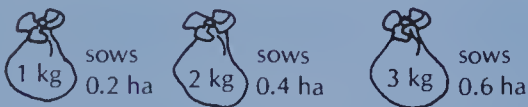
Introducing the Lesson

Show several areas of rectangular regions on 10 by 10 grids (provided with this *Teacher's Resource Book*) similar to the following. Point out that the grid represents one whole and that each square is 0.01 of the whole. Discuss the lengths, widths, and areas of the rectangular regions. Note that tenths times tenths equals hundredths. Note also the number of decimal places in the factors and in the product.

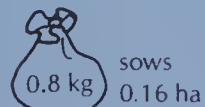


Teaching the Lesson

Read and discuss the problem at the top of page 200. Use illustrations and estimating skills to help the students understand the situation and to estimate a reasonable answer.



From these calculations, the students should see that a reasonable answer would be between 0.1 ha and 0.2 ha (or 0.10 ha and 0.20 ha).

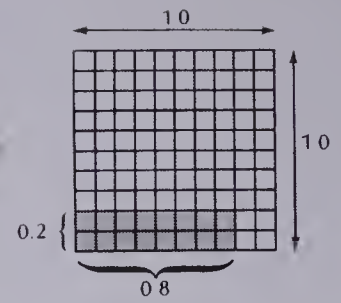


0.8 kg sows more than half as much.
 $0.8 \times 0.2 = 0.16$ ha

Point out the explanation of the multiplication algorithm shown on page 200. Note the number of decimal places in the product and that tenths times tenths equals hundredths.

Multiplying by Tenths

Mrs. Sims wants to plant carrots. She learned that a kilogram of seed will sow 0.2 ha (hectares). How much will 0.8 kg of seed sow?



$$0.2 \times 0.8 = ?$$

The large square is 1 square unit.
 By counting small squares, we see:

$$0.2 \times 0.8 = \frac{16}{100} = 0.16$$

The seed will sow 0.16 ha (hectares).

Multiply

Count the decimal places in the factors

Put the decimal point in the answer

$$\begin{array}{r} 0.2 \\ \times 0.8 \\ \hline \end{array}$$

$$\begin{array}{r} 0.2 \\ \times 0.8 \\ \hline 016 \end{array}$$

2

$$\begin{array}{r} 0.2 \\ \times 0.8 \\ \hline 0.16 \end{array}$$

EXERCISES

Multiply. How many decimal places are there?

1. $\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$

2. $\begin{array}{r} 0.3 \\ \times 2 \\ \hline 0.6 \end{array}$

3. $\begin{array}{r} 0.3 \\ \times 0.2 \\ \hline 0.06 \end{array}$

4. $\begin{array}{r} 1 \\ \times 4 \\ \hline 4 \end{array}$

5. $\begin{array}{r} 0.1 \\ \times 4 \\ \hline 0.4 \end{array}$

6. $\begin{array}{r} 0.1 \\ \times 0.4 \\ \hline 0.04 \end{array}$

7. $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$

8. $\begin{array}{r} 0.6 \\ \times 4 \\ \hline 2.4 \end{array}$

9. $\begin{array}{r} 0.6 \\ \times 0.4 \\ \hline 0.24 \end{array}$

10. $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$

11. $\begin{array}{r} 0.9 \\ \times 7 \\ \hline 6.3 \end{array}$

12. $\begin{array}{r} 0.9 \\ \times 0.7 \\ \hline 0.63 \end{array}$

13. $\begin{array}{r} 0.7 \\ \times 0.5 \\ \hline 0.35 \end{array}$

14. $\begin{array}{r} 0.4 \\ \times 0.8 \\ \hline 0.32 \end{array}$

15. $\begin{array}{r} 0.9 \\ \times 0.6 \\ \hline 0.54 \end{array}$

16. $\begin{array}{r} 0.8 \\ \times 0.9 \\ \hline 0.72 \end{array}$

17. $\begin{array}{r} 0.3 \\ \times 0.5 \\ \hline 0.15 \end{array}$

18. $\begin{array}{r} 0.7 \\ \times 0.2 \\ \hline 0.14 \end{array}$

19. $\begin{array}{r} 0.7 \\ \times 0.7 \\ \hline 0.49 \end{array}$

20. $\begin{array}{r} 0.9 \\ \times 0.8 \\ \hline 0.72 \end{array}$

Using the Exercises

- Questions 1 to 12 are in sets of three; the digits stay the same, but the place value changes. Students should compare the answers of each set.
- Questions 13 to 20 provide practice in multiplying tenths by tenths. Check that the students have placed the decimal points correctly in the products.

PRACTICE

Find the product.

1. $\begin{array}{r} 0.6 \\ \times 0.6 \\ \hline 0.36 \end{array}$
2. $\begin{array}{r} 0.5 \\ \times 0.2 \\ \hline 0.10 \end{array}$
3. $\begin{array}{r} 0.6 \\ \times 0.7 \\ \hline 0.42 \end{array}$
4. $\begin{array}{r} 0.7 \\ \times 0.8 \\ \hline 0.56 \end{array}$
5. $\begin{array}{r} 0.4 \\ \times 0.7 \\ \hline 0.28 \end{array}$
6. $\begin{array}{r} 0.7 \\ \times 2 \\ \hline 1.4 \end{array}$
7. $\begin{array}{r} 14 \\ \times 5 \\ \hline 70 \end{array}$
8. $\begin{array}{r} 0.6 \\ \times 0.4 \\ \hline 0.24 \end{array}$
9. $\begin{array}{r} 0.4 \\ \times 6 \\ \hline 2.4 \end{array}$
10. $\begin{array}{r} 20 \\ \times 9 \\ \hline 180 \end{array}$
11. $\begin{array}{r} 0.7 \\ \times 0.4 \\ \hline 0.28 \end{array}$
12. $\begin{array}{r} 0.31 \\ \times 9 \\ \hline 2.79 \end{array}$
13. $\begin{array}{r} 1.4 \\ \times 3 \\ \hline 4.2 \end{array}$
14. $\begin{array}{r} 2.7 \\ \times 25 \\ \hline 67.5 \end{array}$
15. $\begin{array}{r} 0.8 \\ \times 0.6 \\ \hline 0.48 \end{array}$

Solve.

16. A kilogram of lettuce seed will sow 0.9 ha (hectares). What area will 0.5 kg of seed sow? 0.45 ha
17. Each hectare of cherry orchard should be fertilized with 0.2 t of ammonium nitrate. The Kirks have 0.7 ha in cherries. How much fertilizer do they need? 0.14 t

REVIEW

Multiply.

- A36 1. $\begin{array}{r} 0.53 \\ \times 2 \\ \hline 1.06 \end{array}$
2. $\begin{array}{r} 0.27 \\ \times 5 \\ \hline 1.35 \end{array}$
3. $\begin{array}{r} 0.84 \\ \times 9 \\ \hline 7.56 \end{array}$
4. $\begin{array}{r} 0.19 \\ \times 7 \\ \hline 1.33 \end{array}$
- A37 5. $\begin{array}{r} 2.55 \\ \times 5 \\ \hline 12.75 \end{array}$
6. $\begin{array}{r} 1.06 \\ \times 7 \\ \hline 7.42 \end{array}$
7. $\begin{array}{r} 8.26 \\ \times 5 \\ \hline 41.3 \end{array}$
8. $\begin{array}{r} 5.34 \\ \times 6 \\ \hline 32.04 \end{array}$
- A38 9. $\begin{array}{r} 18 \\ \times 0.6 \\ \hline 10.8 \end{array}$
10. $\begin{array}{r} 35 \\ \times 1.3 \\ \hline 45.5 \end{array}$
11. $\begin{array}{r} 210 \\ \times 0.7 \\ \hline 147.0 \end{array}$
12. $\begin{array}{r} 365 \\ \times 2.8 \\ \hline 1022.0 \end{array}$
- A39 13. $\begin{array}{r} 0.5 \\ \times 0.9 \\ \hline 0.45 \end{array}$
14. $\begin{array}{r} 0.2 \\ \times 0.7 \\ \hline 0.14 \end{array}$
15. $\begin{array}{r} 0.7 \\ \times 0.8 \\ \hline 0.56 \end{array}$
16. $\begin{array}{r} 0.9 \\ \times 0.4 \\ \hline 0.36 \end{array}$

201

Assigning the Practice

Minimum: 1-16

Average: 1-17

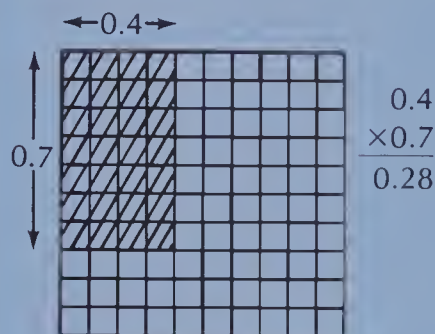
Enriched: 1-17

Review Exercises

Questions	Objective	Pages
1-4	A36	194-195
5-8	A37	196-197
9-12	A38	198-199
13-16	A39	200-201

Reinforcement

1. Ask the students to illustrate the first five multiplications in the Practice section at the top of page 201 as rectangular regions on a 10×10 grid. Have them draw the factors as the length and width of the rectangle. Squares can be counted to verify the multiplied product. (A 10×10 grid represents one whole.) For example, number 5 of the Practice section:



2. Have the students complete multiplication tables similar to the following. Note the patterns.

\times	1000	100	10	1	0.1
0.1					

\times	1000	100	10	1	0.1
0.5					

Enrichment

1. Draw rectangular regions on a 10×10 grid as in the first Reinforcement activity above. Have the students write a multiplication of decimals in tenths for each.

2. Ask the students to devise more multiplication tables as in the second Reinforcement activity above. Study the patterns and then decide what multiplying a number by a tenth is equivalent to. *Dividing by ten.*

Extra Practice

Worksheet A39

Pages 200-201

Each large square represents 1 m^2 .

a. Find the area, in square metres, of each rectangle.

1. $\begin{array}{r} 0.3 \text{ m} \\ \times 0.6 \text{ m} \\ \hline 0.18 \text{ m} \end{array}$
2. $\begin{array}{r} 0.4 \text{ m} \\ \times 0.9 \text{ m} \\ \hline 0.36 \text{ m} \end{array}$
3. $\begin{array}{r} 0.7 \text{ m} \\ \times 0.7 \text{ m} \\ \hline 0.49 \text{ m} \end{array}$

b. Draw a rectangle in each grid for each multiplication. Find the area in square metres.

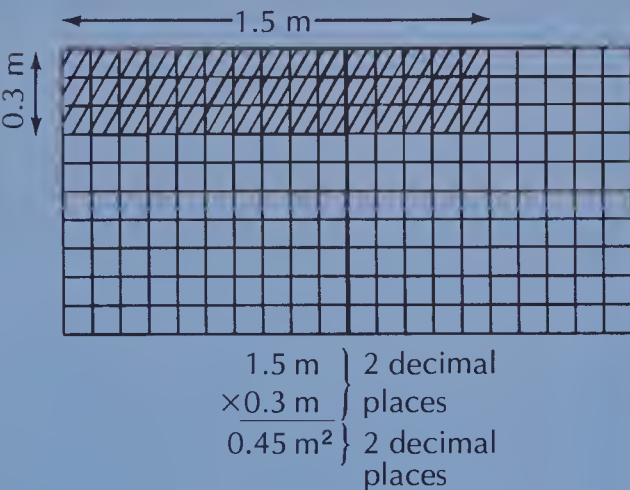
4. $\begin{array}{r} 0.5 \text{ m} \\ \times 0.2 \text{ m} \\ \hline 0.10 \text{ m} \end{array}$
5. $\begin{array}{r} 0.8 \text{ m} \\ \times 0.6 \text{ m} \\ \hline 0.48 \text{ m} \end{array}$
6. $\begin{array}{r} 0.9 \text{ m} \\ \times 0.8 \text{ m} \\ \hline 0.72 \text{ m} \end{array}$

Objective A40

Multiply a decimal greater than one in tenths by a decimal less than one in tenths.

Introducing the Lesson

Make illustrations of rectangular regions on the chalkboard on 10×10 grids similar to the one below. Point out that each 10×10 grid represents 1 m^2 . Have the students determine the lengths, widths, and areas of the rectangles. Stress the number of decimal places in the products.



Teaching the Lesson

Read and discuss the problem situation at the top of page 202. Show the students how to substitute whole numbers to help them decide on the operation to use.

1 m^3 of barley has a mass of 2 t .
A bin can hold 5 m^3 of barley.
 5 m^3 of barley has a mass of 5×2 or 10 t

or,

A bin can hold 8 m^3 of barley.
 8 m^3 of barley has a mass of 8×2 or 16 t .

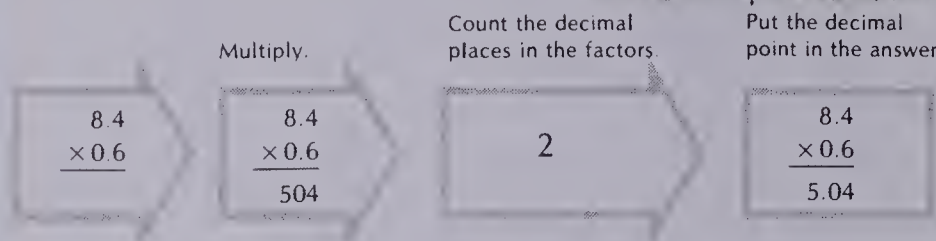
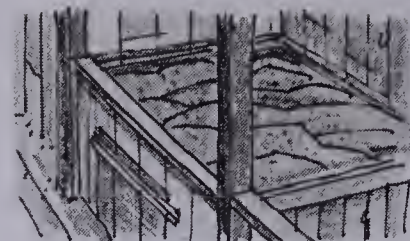
Once the students see that multiplication is required in this situation, reread the problem and discuss the solution shown on page 202.

1 m^3 of barley has a mass of 0.6 t .
A bin can hold 8.4 m^3 of barley.
 8.4 m^3 of barley has a mass of 8.4×0.6 or 5.04 t .

Point out how estimation can be used to check the reasonableness of the product.

Multiplying by Tenths

A cubic metre of barley has a mass of 0.6 t . The Caseys barley bin holds 8.4 m^3 . What is the mass of the barley when the bin is full?



There are 5.04 t of barley in the bin when it is full.

Check by estimating:

0.6 is about $\frac{1}{2}$. 8.4 is about 8 .

0.6×8.4 is about $\frac{1}{2} \times 8$ or 4 .

EXERCISES

How many decimal places are there in the factors? Multiply.

1. $\begin{array}{r} 34 \\ \times 0.2 \\ \hline 6.8 \end{array}$	2. $\begin{array}{r} 3.4 \\ \times 0.2 \\ \hline 0.68 \end{array}$	3. $\begin{array}{r} 61 \\ \times 0.1 \\ \hline 6.1 \end{array}$	4. $\begin{array}{r} 6.1 \\ \times 0.1 \\ \hline 0.61 \end{array}$	5. $\begin{array}{r} 46 \\ \times 0.7 \\ \hline 32.2 \end{array}$
6. $\begin{array}{r} 4.6 \\ \times 0.7 \\ \hline 3.22 \end{array}$	7. $\begin{array}{r} 75 \\ \times 0.8 \\ \hline 60.0 \end{array}$	8. $\begin{array}{r} 7.5 \\ \times 0.8 \\ \hline 6.00 \end{array}$	9. $\begin{array}{r} 23 \\ \times 0.3 \\ \hline 6.9 \end{array}$	10. $\begin{array}{r} 2.3 \\ \times 0.3 \\ \hline 0.69 \end{array}$
11. $\begin{array}{r} 5.6 \\ \times 0.7 \\ \hline 3.92 \end{array}$	12. $\begin{array}{r} 7.2 \\ \times 0.4 \\ \hline 2.88 \end{array}$	13. $\begin{array}{r} 9.3 \\ \times 0.6 \\ \hline 5.58 \end{array}$	14. $\begin{array}{r} 1.8 \\ \times 0.8 \\ \hline 1.44 \end{array}$	15. $\begin{array}{r} 3.7 \\ \times 0.5 \\ \hline 1.85 \end{array}$
Estimate. Then multiply.				
16. $\begin{array}{r} 8.4 \\ \times 0.6 \\ \hline 5.04 \end{array}$	17. $\begin{array}{r} 7.8 \\ \times 0.5 \\ \hline 3.9 \end{array}$	18. $\begin{array}{r} 4.3 \\ \times 0.7 \\ \hline 3.01 \end{array}$	19. $\begin{array}{r} 6.9 \\ \times 0.4 \\ \hline 2.76 \end{array}$	20. $\begin{array}{r} 5.5 \\ \times 0.9 \\ \hline 4.95 \end{array}$

Using the Exercises

- Questions 1 to 10 are in pairs in which the digits remain the same but the place value changes. See that the students properly position the decimal point in the product.
- Questions 11 to 15 involve multiplying two decimals in tenths.
- Questions 16 to 20 require the students to estimate before multiplying. Do this step orally with the students to check their rounding skills. A correct response would be:

$$\begin{array}{r} 7.8 \\ \times 0.5 \\ \hline \end{array} \longrightarrow \frac{1}{2} \times 8 = 4 \longrightarrow \begin{array}{r} 7.8 \\ \times 0.5 \\ \hline 3.90 \end{array}$$

PRACTICE

Copy the question. Put the decimal point in the answer.

1. $\begin{array}{r} 3.2 \\ \times 0.3 \\ \hline \end{array}$	2. $\begin{array}{r} 4.3 \\ \times 0.2 \\ \hline \end{array}$	3. $\begin{array}{r} 2.75 \\ \times 3 \\ \hline \end{array}$	4. $\begin{array}{r} 0.7 \\ \times 0.6 \\ \hline \end{array}$	5. $\begin{array}{r} 9.5 \\ \times 7 \\ \hline \end{array}$
$\begin{array}{r} 0.96 \\ \uparrow \end{array}$	$\begin{array}{r} 0.86 \\ \uparrow \end{array}$	$\begin{array}{r} 825 \\ \uparrow \end{array}$	$\begin{array}{r} 0.42 \\ \uparrow \end{array}$	$\begin{array}{r} 665 \\ \uparrow \end{array}$

Find the product.

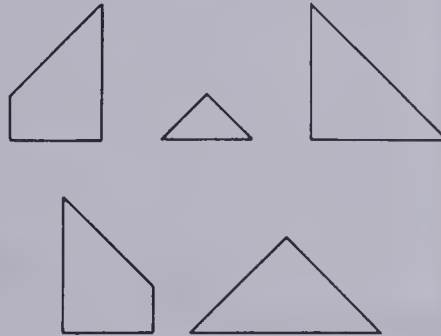
6. $\begin{array}{r} 4.1 \\ \times 0.2 \\ \hline \end{array}$	7. $\begin{array}{r} 2.4 \\ \times 0.3 \\ \hline \end{array}$	8. $\begin{array}{r} 5.3 \\ \times 0.4 \\ \hline \end{array}$	9. $\begin{array}{r} 6.8 \\ \times 0.6 \\ \hline \end{array}$	10. $\begin{array}{r} 7.5 \\ \times 0.5 \\ \hline \end{array}$
$\begin{array}{r} 0.82 \\ \hline \end{array}$	$\begin{array}{r} 0.72 \\ \hline \end{array}$	$\begin{array}{r} 2.12 \\ \hline \end{array}$	$\begin{array}{r} 4.08 \\ \hline \end{array}$	$\begin{array}{r} 3.75 \\ \hline \end{array}$
11. $\begin{array}{r} 9.6 \\ \times 0.7 \\ \hline \end{array}$	12. $\begin{array}{r} 8.2 \\ \times 0.5 \\ \hline \end{array}$	13. $\begin{array}{r} 2.6 \\ \times 0.9 \\ \hline \end{array}$	14. $\begin{array}{r} 3.7 \\ \times 0.8 \\ \hline \end{array}$	15. $\begin{array}{r} 5.6 \\ \times 0.7 \\ \hline \end{array}$
$\begin{array}{r} 6.72 \\ \hline \end{array}$	$\begin{array}{r} 4.1 \\ \hline \end{array}$	$\begin{array}{r} 2.34 \\ \hline \end{array}$	$\begin{array}{r} 2.96 \\ \hline \end{array}$	$\begin{array}{r} 3.92 \\ \hline \end{array}$
16. $\begin{array}{r} 20.3 \\ \times 0.3 \\ \hline \end{array}$	17. $\begin{array}{r} 341 \\ \times 0.4 \\ \hline \end{array}$	18. $\begin{array}{r} 48.3 \\ \times 0.6 \\ \hline \end{array}$	19. $\begin{array}{r} 574 \\ \times 0.7 \\ \hline \end{array}$	20. $\begin{array}{r} 65.8 \\ \times 0.8 \\ \hline \end{array}$
$\begin{array}{r} 6.09 \\ \hline \end{array}$	$\begin{array}{r} 136.4 \\ \hline \end{array}$	$\begin{array}{r} 28.98 \\ \hline \end{array}$	$\begin{array}{r} 401.8 \\ \hline \end{array}$	$\begin{array}{r} 52.64 \\ \hline \end{array}$

Solve.

21. A hectare of peas can be expected to yield 3.9 t. The Giordanos planted 0.8 ha (hectares) in peas. What yield can they expect? 3.12 t
22. It takes 19.5 kg of beet seed to sow a hectare. How much is needed to sow 0.7 ha? 13.65 kg

You're a Square

Trace these figures. Paste the tracing on heavy paper. Cut out the pieces and fit them together to make a square.



203

Assigning the Practice

Minimum: 1-21

Average: 1-22

Enriched: 1-22

Reinforcement

1. Give the students a worksheet of 10×10 grids (provided with this *Teacher's Resource Book*). Ask them to illustrate as rectangular regions the multiplication questions 6 to 10 in the Practice section at the top of page 203. Have students draw the factors as the length and width of the rectangle. Squares can be counted to verify the multiplied product. (One 10×10 grid represents 1 m^2 .)

2. Have the students complete the following charts. Ask them to use the patterns to extend the chart.

a. Rule: $\times 0.5$

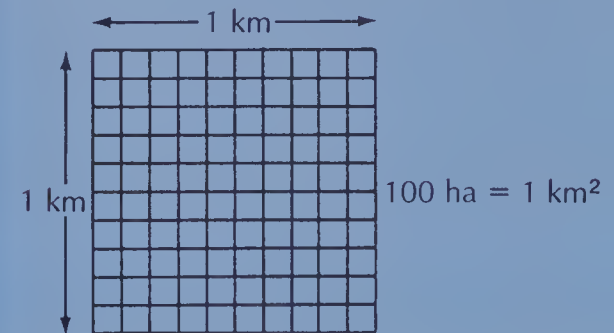
In	Out
16	
15.5	
15	
14.5	
14	
13.5	
13	

b. Rule: $\times 0.1$

In	Out
4	
4.5	
5	
5.5	
6	
6.5	
7	

Enrichment

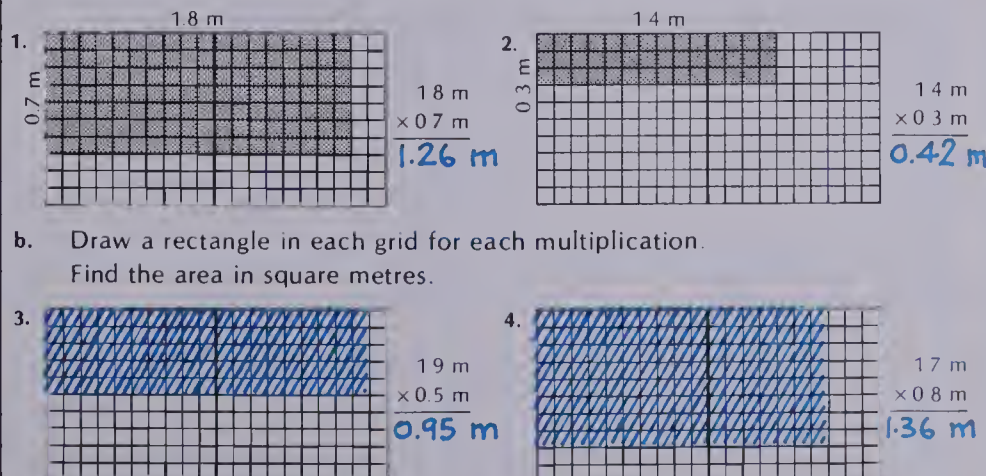
1. Assign *You're a Square* at the bottom of page 203.
2. Show the students the following illustration of the relationship, $100 \text{ ha} = 1 \text{ km}^2$. Give the students a worksheet of 10×10 grids and ask them to illustrate all the possible rectangular regions which would have an area of 0.48 km^2 (or 0.24 km^2 , 0.60 km^2 , etc.).



Extra Practice

Each 10 by 10 square represents 1 m^2 .

- a. Find the area, in square metres, of each rectangle.



Worksheet A40

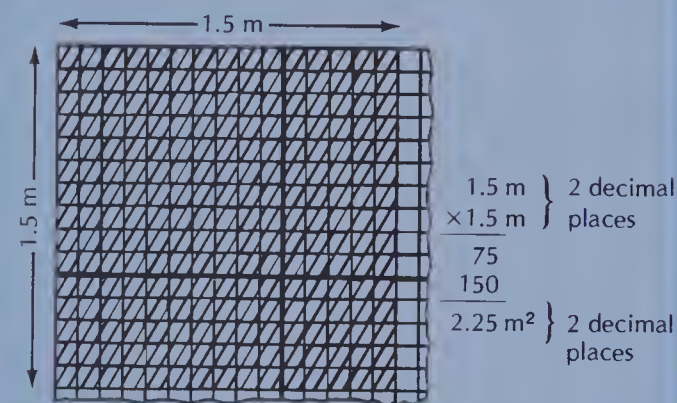
Pages 202-203

Objective A41

Multiply a decimal greater than one in tenths by another decimal in the same form.

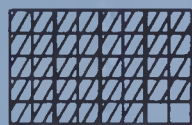
Introducing the Lesson

Make illustrations of rectangular regions similar to the one below. Point out that each of the four 10 by 10 grids represent 1 m^2 . Have the students determine the lengths, widths, and areas of the rectangles. Show the multiplication algorithm for each. Discuss the placement of the decimal point in the product.



Teaching the Lesson

Read and discuss the problem situation at the top of page 204. Make a sketch of the 3.8 ha orchard and explain that each hectare yields 4.3 t of cherries. Let the students discover that multiplication is needed for the solution. (Change the numbers in the problem to whole numbers for those who have difficulty in deciding on the operation to use.)



Each hectare yields 4.3 t cherries.

Students can mentally complete this table to estimate the answer.

1 ha yields 4.3 t
2 ha yields 8.6 t (2×4.3)
3 ha yields 12.9 t (3×4.3)
4 ha yields 17.2 t (4×4.3)

They should see that the answer falls between 12.9 t and 17.2 t, but closer to the latter.

Also show how the product can be estimated by rounding the factors to the nearest whole number.

Multiplying by Tenths

The Sutters have a 3.8 ha orchard of sweet cherries. They expect each hectare to yield 4.3 t of cherries. How many tonnes of cherries do they expect in all?



Multiply.

Count the decimal places in the factors.

Put the decimal point in the answer.

$$\begin{array}{r} 3.8 \\ \times 4.3 \\ \hline 114 \\ 1520 \\ \hline 1634 \end{array}$$

The Sutters expect 16.34 t of cherries.

Check by estimating:

4.3 is about 4. 3.8 is about 4.

4.3×3.8 is about 4×4 or 16.

EXERCISES

Multiply. Check by estimating.

- | | | | | |
|---|--|---|--|--|
| 1. $\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$ | 2. $\begin{array}{r} 4.1 \\ \times 3.2 \\ \hline 13.12 \end{array}$ | 3. $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$ | 4. $\begin{array}{r} 5.7 \\ \times 4.8 \\ \hline 27.36 \end{array}$ | 5. $\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$ |
| 6. $\begin{array}{r} 2.3 \\ \times 1.8 \\ \hline 4.14 \end{array}$ | 7. $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$ | 8. $\begin{array}{r} 8.7 \\ \times 5.4 \\ \hline 46.98 \end{array}$ | 9. $\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$ | 10. $\begin{array}{r} 6.5 \\ \times 3.4 \\ \hline 22.1 \end{array}$ |
| 11. $\begin{array}{r} 2.1 \\ \times 3.4 \\ \hline 7.14 \end{array}$ | 12. $\begin{array}{r} 6.8 \\ \times 6.7 \\ \hline 45.56 \end{array}$ | 13. $\begin{array}{r} 2.5 \\ \times 7.4 \\ \hline 18.5 \end{array}$ | 14. $\begin{array}{r} 7.3 \\ \times 8.2 \\ \hline 59.86 \end{array}$ | 15. $\begin{array}{r} 4.9 \\ \times 5.1 \\ \hline 24.99 \end{array}$ |

Using the Exercises

- Questions 1 to 10 are in pairs. First, a rounded version of the problem is given to establish an estimated answer; then the problem is given.
- Questions 11 to 15 provide more practice in multiplying tenths.

PRACTICE

Copy the question. Put the decimal point in the answer.

1. $\begin{array}{r} 3.1 \\ \times 1.2 \\ \hline 372 \end{array}$
↑
2. $\begin{array}{r} 0.43 \\ \times 8 \\ \hline 344 \end{array}$
↑
3. $\begin{array}{r} 0.7 \\ \times 0.8 \\ \hline 0.56 \end{array}$
↑
4. $\begin{array}{r} 6.2 \\ \times 0.5 \\ \hline 310 \end{array}$
↑
5. $\begin{array}{r} 2.95 \\ \times 7 \\ \hline 2065 \end{array}$
↑

Find the product. Check by estimating.

6. $\begin{array}{r} 2.4 \\ \times 1.2 \\ \hline 2.88 \end{array}$
7. $\begin{array}{r} 1.3 \\ \times 3.1 \\ \hline 4.03 \end{array}$
8. $\begin{array}{r} 4.7 \\ \times 3.8 \\ \hline 17.86 \end{array}$
9. $\begin{array}{r} 5.8 \\ \times 7.5 \\ \hline 43.5 \end{array}$
10. $\begin{array}{r} 6.9 \\ \times 8.4 \\ \hline 57.96 \end{array}$
11. $\begin{array}{r} 9.2 \\ \times 3.1 \\ \hline 28.52 \end{array}$
12. $\begin{array}{r} 2.7 \\ \times 2.7 \\ \hline 7.29 \end{array}$
13. $\begin{array}{r} 4.6 \\ \times 3.7 \\ \hline 17.02 \end{array}$
14. $\begin{array}{r} 5.7 \\ \times 5.4 \\ \hline 30.78 \end{array}$
15. $\begin{array}{r} 4.8 \\ \times 7.6 \\ \hline 36.48 \end{array}$
16. $\begin{array}{r} 0.42 \\ \times 8 \\ \hline 3.36 \end{array}$
17. $\begin{array}{r} 44.2 \\ \times 39 \\ \hline 1723.8 \end{array}$
18. $\begin{array}{r} 0.8 \\ \times 0.5 \\ \hline 0.40 \end{array}$
19. $\begin{array}{r} 298 \\ \times 2.7 \\ \hline 804.6 \end{array}$
20. $\begin{array}{r} 9.20 \\ \times 9 \\ \hline 82.80 \end{array}$

Solve.

21. It takes 87.4 kg of beans to sow a hectare.
How much is needed to sow 6.5 ha? **568.1 kg**
22. Joyce worked on a farm weeding vegetables. One week she worked 24.5 h. She earned \$3.50 dollars an hour.
How much did she earn? **\$85.75**

Potato Pay

A farmer has 4.5 ha planted in potatoes. He expects 22.5 t from each hectare. If he gets \$80 for each tonne of potatoes, what will his income be?

\$8100.00



205

Assigning the Practice

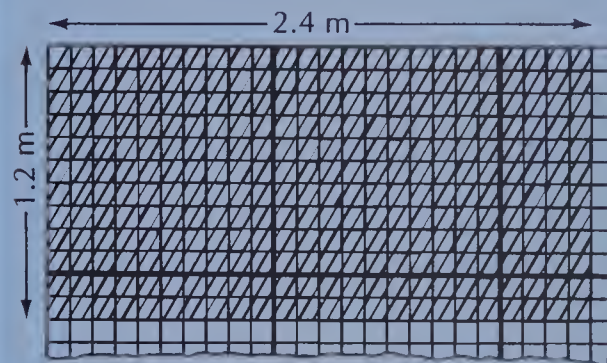
Minimum: 1–15, 21

Average: 6–22

Enriched: 6–22

Reinforcement

1. Give the students a worksheet of 10×10 grids. Ask them to illustrate as rectangular regions, the multiplication questions 6 to 8 in the Practice section at the top of page 205. Have them draw the factors as the length and width of the rectangle. Squares can be counted to verify the multiplied product. (One 10×10 grid represents 1 m^2 .) For example, question 6 of the Practice section:



$$2.4 \text{ m} \times 1.2 \text{ m} = 2.88 \text{ m}^2$$

2. Have the students complete these cross-number puzzles.

a. \times

15	0.3	
22	0.2	

b. \times

36	0.5	
14	0.4	

c. \times

71	0.7	
25	0.3	

d. \times

63	0.1	
42	0.9	

Enrichment

1. Assign Potato Pay at the bottom of page 205.

2. Write sets of farm facts on the chalkboard. Have the students devise word problems from the facts for the class to solve.

8.2 kg apples
1 kg costs \$2.

Corn field measurements:
length, 1.2 km
width, 0.6 km

Extra Practice

Worksheet A41

Pages 204-205

Multiply.

1. $\begin{array}{r} 2.2 \\ \times 1.3 \\ \hline 2.86 \end{array}$
2. $\begin{array}{r} 7.4 \\ \times 5.6 \\ \hline 41.44 \end{array}$
3. $\begin{array}{r} 3.8 \\ \times 1.5 \\ \hline 5.70 \end{array}$
4. $\begin{array}{r} 8.5 \\ \times 7.2 \\ \hline 61.20 \end{array}$
5. $\begin{array}{r} 3.9 \\ \times 2.1 \\ \hline 8.19 \end{array}$
6. $\begin{array}{r} 9.7 \\ \times 6.8 \\ \hline 65.96 \end{array}$
7. $\begin{array}{r} 2.5 \\ \times 4.7 \\ \hline 11.75 \end{array}$
8. $\begin{array}{r} 3.8 \\ \times 4.3 \\ \hline 16.34 \end{array}$
9. $\begin{array}{r} 2.7 \\ \times 4.9 \\ \hline 13.23 \end{array}$
10. $\begin{array}{r} 0.7 \\ \times 1.7 \\ \hline 1.19 \end{array}$
11. $\begin{array}{r} 42.7 \\ \times 6.4 \\ \hline 273.28 \end{array}$
12. $\begin{array}{r} 0.56 \\ \times 8 \\ \hline 4.48 \end{array}$

Solve.

13. Mr. Solway bought 8.5 L of diesel fuel. The cost was 48.9¢ per litre.
How much did the fuel cost? **\$4.16**

Objective N18

Round decimals to the nearest tenth; estimate products.

Introducing the Lesson

Review rounding numbers to the nearest ten and whole number (Unit 1, Lessons 4 and 10, pages 8 and 20).

- a. 56.3 rounded to the nearest ten
 $56.3 \rightarrow 60.0$

Because the digit to the right of the tens place is 5 or more, it rounds up to 6 tens and the rest of the digits become zeros.

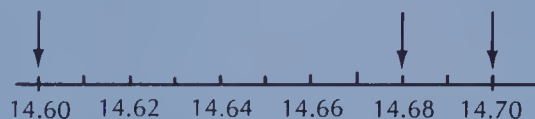
- b. 34.28 rounded to the nearest whole
 $34.28 \rightarrow 34.00$

Because the digit to the right of the ones place is less than 5, it stays as 4 ones and the rest of the digits become zeros.

Teaching the Lesson

Explain that sometimes it is helpful to round a decimal to the nearest tenth. Read and discuss the example at the top of page 206. Point out how the digit in the hundredths place determines how a decimal is rounded to the nearest tenth.
 $14.68 \rightarrow 14.70$

Because the digit to the right of the tenths place is 5 or more, it rounds up to 7 tenths and the rest of the digits become zeros. Illustrate the example on a number line.



14.68 is closer to 14.70 than to 14.60.

Discuss several other similar examples.

Have the students recall that rounding to the nearest whole number is helpful for estimating products.

$$5.7 \times 6.3 \rightarrow 6 \times 6 = 36$$

Show that rounding to the nearest tenth can also be helpful in estimating products.

$$1.23 \times 1.24 \rightarrow 1.2 \times 1.2 = 1.44$$

$$1.04 \times 1.05 \rightarrow 1.0 \times 1.1 = 1.10$$

Rounding and Estimating

Farmer Bye harvested 14.68 t of corn
 Farmer Bennie harvested 14.63 t.
 They keep track of their harvests to the nearest tenth of a tonne.



To round a decimal to the nearest tenth:

Find the tenths digit.

Look at the hundredths digit.

If it is 5 or more, round up. Add 1 to the tenths digit.

14.68

14.68

14.7

If it is 4 or less, the tenths digit stays the same.

14.63

14.63

14.6

Farmer Bye harvested about 14.7 t.
 Farmer Bennie harvested about 14.6 t.

EXERCISES

How many hundredths are in each number?

1. 39.36 **6** 2. 8.74 **4** 3. 52.60 **0** 4. 4.35 **5**

Round each to the nearest tenth.

5. 39.36 **39.4** 6. 8.74 **8.7** 7. 52.60 **52.6** 8. 4.35 **4.4**
 9. 81.24 **81.2** 10. 81.25 **81.3** 11. 81.26 **81.3** 12. 81.96 **82.0**

Estimate the product. Round the factors to tenths before you multiply.

13. $\begin{array}{r} 36.54 \\ \times 2 \\ \hline 73.0 \end{array}$ 14. $\begin{array}{r} 8.63 \\ \times 1.5 \\ \hline 12.9 \end{array}$ 15. $\begin{array}{r} 8.79 \\ \times 3.54 \\ \hline 30.8 \end{array}$ 16. $\begin{array}{r} 2.64 \\ \times 5.95 \\ \hline 15.6 \end{array}$

206

Using the Exercises

- Questions 1 to 4 ask students to identify the hundredths place. This will help to prepare the students to round to the tenths place in questions 5 to 12. These questions all can be done orally.
- Ask the students to orally round the factors in questions 13 to 16 to tenths.

PRACTICE

Round to the nearest tenth.

1. 3.59 **3.6** 2. 28.78 **28.8** 3. 6.48 **6.5** 4. 71.63 **71.6**
 5. 5.91 **5.9** 6. 79.03 **79.0** 7. 5.82 **5.8** 8. 26.36 **26.4**
 9. 43.85 **43.9** 10. 2.98 **3.0** 11. 174.63 **174.6** 12. 923.55 **293.6**

Round to the nearest dime.

13. \$39.26 **\$39.30** 14. \$409.95 **\$410.00** 15. \$800.93 **\$801.00** 16. \$31.97 **\$32.00**

17. Round the numbers.

	to nearest ten	to nearest whole	to nearest tenth
93.57	90	94	93.6
14.28	10	14	14.3
89.59	90	90	89.6
98.35	100	98	98.4

Estimate the products.

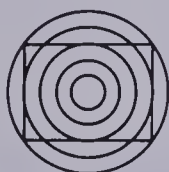
18. 6×34.98 **\$210.00** 19. 7.5×5.04 **40** 20. 8.64×4.95 **45**
 21. $12 \times \$3.99$ **\$48.00** 22. $8.5 \times \$2.39$ **\$18.00** 23. $6.69 \times \$2.34$ **\$14.00**

Multiply. Give the answers to the nearest tenth.

24. $\begin{array}{r} 5.7 \\ \times 8.9 \\ \hline \end{array}$ **50.7** 25. $\begin{array}{r} 2.8 \\ \times 6.3 \\ \hline \end{array}$ **17.6** 26. $\begin{array}{r} 3.5 \\ \times 4.9 \\ \hline \end{array}$ **17.2** 27. $\begin{array}{r} 8.6 \\ \times 6.5 \\ \hline \end{array}$ **55.9**

Rounding?

Are the sides of the rectangle and triangle straight lines? **Yes.**
 Use a ruler to check your answer.



207

Assigning the Practice

Minimum: 1-17
 Average: 5-17, 24-27
 Enriched: 9-27

Reinforcement

1. Ask the students to make a number line illustration, as in the lesson, which shows the following decimals rounded to the nearest tenth.

- a. 4.63, 4.6 or 4.7?
 b. 27.78, 27.7 or 27.8?
 c. 367.85, 367.8 or 367.9?
 d. 60.44, 60.4 or 60.5?

2. Prepare pairs of cards labelled like the following examples. Use the cards for the game Concentration.

3.59	3.6
3.46	3.5
22.12	22.1
22.15	22.2

3. Have the students complete the following rounding chart.

	to the nearest ten dollars	to the nearest dollar	to the nearest dime
\$67.15			
\$93.82			
\$40.93			
\$79.16			

Enrichment

Assign *Rounding?* at the bottom of page 207. Talk about optical illusions. Encourage the students either to devise or to research other optical illusions for display and discussion in the classroom.

Extra Practice

Round to the nearest tenth.

1. 4.78 **4.8** 2. 3.14 **3.1** 3. 7.06 **7.1** 4. 49.15 **49.2**
 5. 72.81 **72.8** 6. 5.53 **5.5** 7. 6.65 **6.7** 8. 92.09 **92.1**

Round to the nearest dime.

9. \$42.67 **\$42.70** 10. \$87.24 **\$87.20** 11. \$9.89 **\$9.90** 12. \$10.99 **\$11.00**

Multiply. Give the answers to the nearest tenth.

13. $\begin{array}{r} 6.2 \\ \times 4.8 \\ \hline \end{array}$ **29.8** 14. $\begin{array}{r} 1.9 \\ \times 2.7 \\ \hline \end{array}$ **5.1** 15. $\begin{array}{r} 5.3 \\ \times 1.4 \\ \hline \end{array}$ **7.4** 16. $\begin{array}{r} 4.8 \\ \times 2.6 \\ \hline \end{array}$ **12.5**

Worksheet N18

Pages 206-207

Objective A42

Divide a decimal in tenths or hundredths by a whole number without a remainder.

Introducing the Lesson

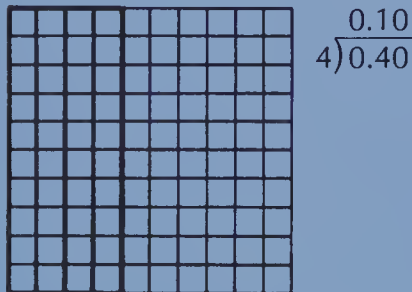
Review dividing money (Unit 4, Lesson 9, pages 90 and 91). Show the class several food prices from newspaper ads. Ask them to divide to find the unit price. Have a few students demonstrate the division at the chalkboard. Discuss the method and point out the placement of the decimal point in the quotient.

Peaches	\$4.29 for 2 kg
---------	-----------------

Onions	5 kg for \$6.95
--------	-----------------

Teaching the Lesson

Illustrate 0.40 on a 10×10 grid. Ask the students how many hundredths there would be in each part if 0.40 were divided into four parts. Record the corresponding division and explain the placement of the decimal point in the quotient.



Ask, "How many hundredths would there be in each part if 0.40 were divided into 8 parts? 2 parts? 5 parts?" Illustrate these examples on a 10×10 grid and discuss the related division.

Turn to the lesson example on page 208. Study it together. Stress that the decimal point in the quotient goes directly above the decimal point in the dividend.

Remind students of the necessity of writing a zero in the ones place if a decimal has no whole numbers.

$$\begin{array}{r} 0.35 \\ 7 \overline{)2.45} \end{array} \quad (\text{not } .35)$$

Dividing Decimals

A farmer harvests 95.52 t of peppers from 8 ha. About how much does he get from each hectare?



To find the answer, divide just like whole numbers.

Write the decimal point

$$8 \overline{)95.52}$$

$$8 \overline{)9552}$$

$$\begin{array}{r} 1194 \\ 8 \overline{)9552} \\ \underline{-8} \\ 15 \\ \underline{-8} \\ 75 \\ \underline{-72} \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

$$\begin{array}{r} 11.94 \\ 8 \overline{)95.52} \end{array}$$

Check by estimating:

95.52 is about 96.

$95.52 \div 8$ is about $96 \div 8$ or 12.

The answer is 11.94 t.

EXERCISES

Divide.

- | | | | | |
|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 1. $2 \overline{)16}$ | 2. $2 \overline{)1.6}$ | 3. $2 \overline{)0.16}$ | 4. $2 \overline{)2.16}$ | 5. $2 \overline{)32.16}$ |
| 6. $5 \overline{)75}$ | 7. $5 \overline{)7.5}$ | 8. $5 \overline{)0.75}$ | 9. $5 \overline{)5.75}$ | 10. $5 \overline{)8.75}$ |
| 11. $4 \overline{)256}$ | 12. $4 \overline{)25.6}$ | 13. $4 \overline{)2.56}$ | 14. $4 \overline{)12.56}$ | 15. $4 \overline{)22.56}$ |
| 16. $7 \overline{)938}$ | 17. $7 \overline{)93.8}$ | 18. $7 \overline{)9.38}$ | 19. $7 \overline{)23.38}$ | 20. $7 \overline{)51.38}$ |
| 21. $3 \overline{)1602}$ | 22. $3 \overline{)160.2}$ | 23. $3 \overline{)16.02}$ | 24. $3 \overline{)34.02}$ | 25. $3 \overline{)46.02}$ |

Using the Exercises

- The questions in each row are related. After the students complete a row, discuss the placement of the decimal points in the quotients and compare the size of the quotients. Show the students how to check their quotients by multiplying.

$$\begin{array}{r} 1.08 \\ 2 \overline{)2.16} \end{array} \quad \text{Check:} \quad \begin{array}{r} 1.08 \\ \times 2 \\ \hline 2.16 \end{array}$$

PRACTICE

Copy and place the decimal point in the quotient.

1. $21 \div 3 = 7$
2. $1.4 \div 2 = 0.7$
3. $0.32 \div 4 = 0.08$
4. $8.5 \div 5 = 1.7$
5. $84 \div 6 = 14$
6. $146 \div 2 = 73$
7. $28.2 \div 3 = 9.4$
8. $3.48 \div 4 = 0.87$
9. $67.5 \div 5 = 13.5$
10. $938 \div 7 = 134$
11. $2019 \div 3 = 673$
12. $19.12 \div 4 = 4.78$
13. $336.5 \div 5 = 67.3$
14. $74.04 \div 6 = 12.34$
15. $9144 \div 8 = 1143$

Divide.

16. $4 \overline{)3.6} = 0.9$
17. $5 \overline{)6.5} = 1.3$
18. $6 \overline{)9.6} = 1.6$
19. $3 \overline{)0.15} = 0.05$
20. $4 \overline{)0.56} = 0.14$
21. $2 \overline{)14.8} = 7.4$
22. $4 \overline{)48.4} = 12.1$
23. $6 \overline{)88.2} = 14.7$
24. $3 \overline{)2.46} = 0.82$
25. $5 \overline{)6.05} = 1.21$
26. $3 \overline{)246.9} = 82.3$
27. $5 \overline{)756.0} = 151.2$
28. $6 \overline{)220.2} = 36.7$
29. $4 \overline{)8536} = 2134$
30. $7 \overline{)89.25} = 12.75$

Solve.

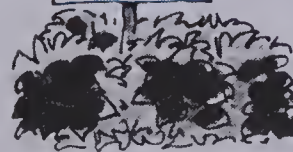
31. A grain farmer sells 6 t of oats to the co-op for \$490.20. How much did he receive for each tonne of oats? $\$81.70$
32. A farmer harvests 201.60 t of fresh cabbage from 5 ha of land. About how much does she get from each hectare? 40.32 t

Better Buy


Which is the better buy?

1.


3 for \$1.47
or
5 for \$2.40


2.

2 for \$1.00
or
3 for \$1.53


3.

3 for \$2.07
or
7 for \$4.76



209

Assigning the Practice

Minimum: 1-25, 31

Average: 7-32

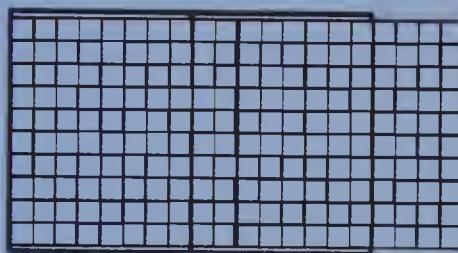
Enriched: 7-32

Reinforcement

1. Assign *Better Buy* at the bottom of page 209.

2. Give the students a worksheet of 10×10 grids to illustrate the following divisions. Also ask them to record the division algorithm for each.

- a. 1.60 divided into 2 parts.
How much in each part?



$$\begin{array}{r} 0.80 \\ 2 \overline{)1.60} \end{array}$$

- b. 0.48 divided into 8 parts.
How many in each part?
- c. 1.20 divided into 6 parts.
How many in each part?

3. Display newspaper ads for items which are sold in groups. Have the students calculate the unit price for each.

Enrichment

Have the students complete the following comparison statements using $<$, $=$, or $>$.

- a. $3.24 \div 4$ ____ 9×0.9
- b. $9.06 \div 3$ ____ 3.02×3
- c. $12.48 \div 2$ ____ 31.2×4
- d. $30.60 \div 5$ ____ 10.2×3

Extra Practice

Place the decimal point in the quotient.

1. $4 \overline{)2.8} = 0.7$
2. $5 \overline{)1.55} = 0.31$
3. $12 \overline{)14.4} = 1.2$
4. $3 \overline{)1.89} = 0.63$
5. $6 \overline{)17.4} = 2.9$
6. $2 \overline{)0.86} = 0.43$
7. $3 \overline{)0.9} = 0.3$
8. $8 \overline{)25.6} = 3.2$

Divide.

9. $9 \overline{)5.4} = 0.6$
10. $4 \overline{)20.4} = 5.1$
11. $5 \overline{)19.0} = 3.8$
12. $7 \overline{)43.4} = 6.2$
13. $6 \overline{)8.16} = 1.36$
14. $4 \overline{)22.72} = 5.68$
15. $5 \overline{)576.5} = 115.3$
16. $9 \overline{)67.5} = 7.5$
17. $8 \overline{)29.12} = 3.64$
18. $7 \overline{)430.5} = 61.5$
19. $9 \overline{)50.4} = 5.6$
20. $6 \overline{)5.22} = 0.87$

Solve.

21. Riva did 6 math problems in 49.8 s. About how long did it take her to do each one? 8.3 s

Worksheet A42

Pages 208-209

Objective A43

Write a fraction as a decimal in tenths, hundredths, or thousandths.

Introducing the Lesson

Review the changing of a fraction to a decimal by writing it first as a fraction in tenths or hundredths.

$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10} = 0.4$$

$$\frac{7}{25} = \frac{7 \times 4}{25 \times 4} = \frac{28}{100} = 0.28$$

Teaching the Lesson

Explain that not all fractions can easily be written as a fraction in tenths and hundredths; yet, all fractions can be expressed as decimals. Consequently, another method can be used—the division method. Show how $\frac{2}{5}$ and $\frac{7}{25}$ can be changed to decimals by dividing.

$$\begin{array}{r} 0.4 \\ 5 \overline{)2.0} \end{array} \quad \begin{array}{r} 0.28 \\ 25 \overline{)7.00} \\ \underline{50} \\ 200 \\ \underline{200} \end{array}$$

Stress the following points as you explain the examples.

- The numerator of the fraction is *always* the dividend and goes inside the division box.
- Whole numbers can be expressed several ways: $2 = 2.0 = 2.00 = 2.000$. As many zeros as are needed can be added on to the dividend to the right of the decimal point without changing its value.
- The denominator of the fraction is *always* the divisor.

Have the students change the following fractions to decimals by dividing. Let the students discover that when the numerator is larger than the denominator, the fraction and the decimal are worth more than one whole.

$$\frac{1}{4} \quad \frac{4}{5} \quad \frac{3}{8} \quad \frac{3}{2} \quad \frac{11}{25} \quad \frac{52}{50}$$

Summarize the lesson as you read and discuss the top of page 210.

Expressing Fractions as Decimals

The original gauge on a storage tank was marked in fourths. When a replacement was received, it was marked in decimals. If the new reading shows 0.8, does a farmer have more or less than when the old reading was $\frac{3}{4}$?

$$\frac{3}{4} \text{ means } 3 \div 4.$$

$$\frac{3}{4} = 0.75$$

$$0.75 < 0.80$$

$$\begin{array}{r} 0.75 \\ 4 \overline{)3.00} \\ \underline{-28} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

The new reading of 0.8 is greater than the old reading.

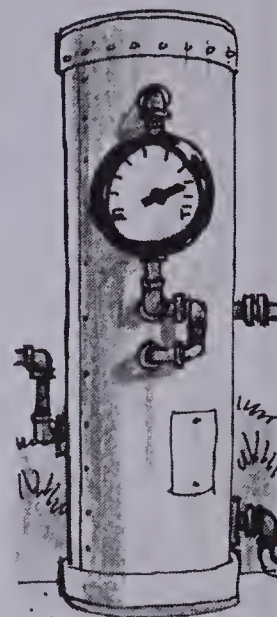
Division can be used to change fractions into decimals.

For example, here's how we change $\frac{3}{5}$ to a decimal.

$$5 \overline{)3.0}$$

$$\begin{array}{r} 0.6 \\ 5 \overline{)3.0} \\ \underline{-30} \\ 0 \end{array}$$

$$\frac{3}{5} = 0.6$$

**EXERCISES**

Change each fraction into a decimal by dividing.

- | | | | | |
|------------------------|-----------------------|------------------------|------------------------|------------------------|
| 1. $\frac{1}{10}$ 0.1 | 2. $\frac{2}{10}$ 0.2 | 3. $\frac{5}{10}$ 0.5 | 4. $\frac{10}{10}$ 1.0 | 5. $\frac{15}{10}$ 1.5 |
| 6. $\frac{1}{2}$ 0.5 | 7. $\frac{2}{2}$ 1.0 | 8. $\frac{3}{2}$ 1.5 | 9. $\frac{4}{2}$ 2.0 | 10. $\frac{5}{2}$ 2.5 |
| 11. $\frac{1}{4}$ 0.25 | 12. $\frac{2}{4}$ 0.5 | 13. $\frac{3}{4}$ 0.75 | 14. $\frac{4}{4}$ 1.0 | 15. $\frac{5}{4}$ 1.25 |
| 16. $\frac{1}{5}$ 0.2 | 17. $\frac{2}{5}$ 0.4 | 18. $\frac{3}{5}$ 0.6 | 19. $\frac{4}{5}$ 0.8 | 20. $\frac{5}{5}$ 1.0 |

Using the Exercises

- Before beginning the exercises, you might ask the students which fractions will be represented by a decimal greater than 1. The students should select the fractions in which the numerator is greater than the denominator. 5, 8, 9, 10, 15
- Ask the students to work the problems for each row and to compare the quotients for the row. The relationships they see will help them to understand the decimals involved.

PRACTICE

Write each fraction as an indicated division.

1. $\frac{1}{4} \div 4$ 2. $\frac{1}{10} \div 10$ 3. $\frac{1}{2} \div 2$ 4. $\frac{3}{10} \div 10$ 5. $\frac{4}{5} \div 5$

Divide. 6. $2 \overline{)1.0}$ 7. $5 \overline{)1.0}$ 8. $10 \overline{)1.0}$ 9. $5 \overline{)3.0}$ 10. $10 \overline{)9.0}$
11. $4 \overline{)1.00}$ 12. $10 \overline{)1.0}$ 13. $50 \overline{)1.00}$ 14. $4 \overline{)3.00}$ 15. $100 \overline{)1.00}$

Express each fraction in decimal form

16. $\frac{7}{10} \div 10$ 0.7 17. $\frac{1}{2} \div 2$ 0.5 18. $\frac{2}{5} \div 5$ 0.4 19. $\frac{2}{2} \div 2$ 1.0 20. $\frac{3}{10} \div 10$ 0.3
21. $\frac{1}{4} \div 4$ 0.25 22. $\frac{1}{5} \div 5$ 0.2 23. $\frac{3}{5} \div 5$ 0.6 24. $\frac{3}{4} \div 4$ 0.75 25. $\frac{10}{10} \div 10$ 1.0

Use division to answer each of these questions.

26. Is $\frac{3}{5} = 0.60$? Yes 27. Is $\frac{1}{2} < 0.49$? No 28. Is $\frac{4}{5} > 0.78$? Yes
29. Is $0.85 < \frac{4}{5}$? No 30. Is $0.76 > \frac{3}{4}$? Yes 31. Is $0.27 > \frac{1}{4}$? Yes

Solve.

32. Which tank has more fuel in it, one showing $\frac{3}{4}$ full or one showing 0.72 full? $\frac{3}{4}$ full

Repeaters

What is the decimal equivalent of $\frac{1}{3}$?

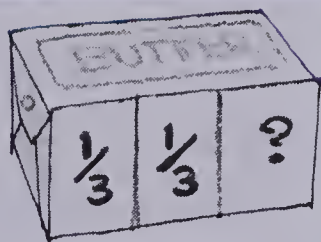
$3 \overline{)1.00}$

Try $1 \div 3$ on a calculator. What happens?

0.3333333

What is the decimal equivalent?

1. $\frac{2}{3} \div 3$ 0.6 2. $\frac{1}{6} \div 6$ 0.16 3. $\frac{5}{6} \div 6$ 0.83 4. $\frac{1}{9} \div 9$ 0.1 5. $\frac{2}{9} \div 9$ 0.2



211

Assigning the Practice

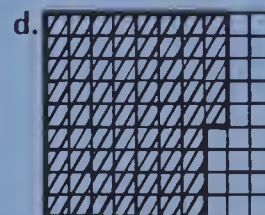
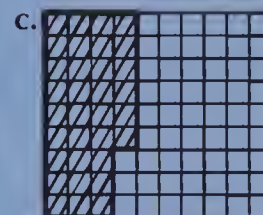
Minimum: 1-25, 32

Average: 6-32

Enriched: 6-32

Reinforcement

1. Have the students name the fraction and decimal for the following illustrations.



2. Have the students change the following fraction families to decimals by dividing. Note the patterns.

a. $\frac{1}{2}, \frac{2}{2}, \frac{3}{2}$

b. $\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}, \frac{8}{8}, \frac{9}{8}$

c. $\frac{1}{20}, \frac{2}{20}, \frac{3}{20}, \frac{4}{20}, \frac{5}{20}, \frac{6}{20}$

d. $\frac{1}{25}, \frac{2}{25}, \frac{3}{25}, \frac{4}{25}, \frac{5}{25}, \frac{6}{25}$

e. $\frac{1}{50}, \frac{2}{50}, \frac{3}{50}, \frac{4}{50}, \frac{5}{50}, \frac{6}{50}$

3. Ask the students to change the fractions on page 210 to a decimal by using a calculator.

$1 \div 10 =$

Enrichment

1. Assign Repeaters at the bottom of page 211. Explain that some fractions can be divided evenly and that others cannot. Those that do not divide evenly are often called repeaters.

2. Ask the students to determine which of the following fractions are repeaters.

$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}, \frac{1}{13}, \frac{1}{14}, \frac{1}{15}, \frac{1}{16}, \frac{1}{17}, \frac{1}{18}, \frac{1}{19}, \frac{1}{20}$

Extra Practice

Worksheet A43

Pages 210-211

Use division to write each fraction as a decimal.

1. $\frac{3}{10} \div 10$ 0.3 2. $\frac{7}{2} \div 2$ 3.5 3. $\frac{4}{5} \div 5$ 0.8 4. $\frac{6}{3} \div 3$ 2.0
5. $\frac{19}{50} \div 50$ 0.38 6. $\frac{1}{4} \div 4$ 0.25 7. $\frac{9}{4} \div 4$ 2.25 8. $\frac{2}{5} \div 5$ 0.4
9. $\frac{7}{25} \div 25$ 0.28 10. $\frac{9}{20} \div 20$ 0.45 11. $\frac{18}{150} \div 150$ 0.12 12. $\frac{47}{20} \div 20$ 2.35

Use division to answer each question.

13. Is $\frac{5}{4} = 1.20$? No 14. Is $\frac{4}{5} < 0.82$? Yes 15. Is $0.85 > \frac{7}{8}$? No
16. Is $0.22 < \frac{1}{5}$? No 17. Is $2.5 > \frac{5}{2}$? No 18. Is $\frac{19}{25} = 0.76$? Yes

Solve.

19. Leah did her homework in $\frac{3}{4}$ of an hour. Nathan did his in 0.65 h. Which one worked longer? Leah

Objective PS8

Use estimation to choose reasonable solutions to word problems.

Introducing the Lesson

Review the previously learned rounding skills as the students orally complete the following chart.

	Round to the nearest				
	1000	100	10	1	0.1
7641.25					
4137.88					
2673.02					
8514.56					

Teaching the Lesson

Point out the importance of estimation by discussing several situations in which the cost of something must be known in advance.

- What is the price of movie theatre tickets? About how much would it cost to buy your family tickets?
- About what is the cost of buying four lunches at a local drive-in restaurant?
- About what would two cans of pop for each person in the class cost?

Estimation

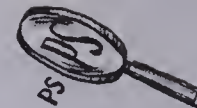
Choose the best estimate.

- Jane bought a skirt for \$47.85 and a sweater for \$62.78. How much did she spend altogether?
a. about \$1 b. about \$100
c. about \$10 d. about \$1000
- Bill buys 74 stamps at 26¢ each. How much does he have to pay for the stamps?
a. about \$2 b. about \$200
c. about \$20 d. about \$2000
- A dinner bill of \$101.68 is evenly shared among 4 people. How much does each person pay?
a. about \$2.50 b. about \$250
c. about \$25 d. about \$2500

Choose the most reasonable estimate for the answer to each operation.

- 38×82
a. about 2400 b. about 3200
c. about 2700 d. about 3600
- $432.683 - 18.42$
a. about 200 b. about 410
c. about 380 d. about 430
- $286.50 \div 6$
a. about \$30 b. about \$50
c. about \$40 d. about \$60
- $5864 + 48$
a. about 5800 b. about 6000
c. about 5900 d. about 6100
- $3.8 \times 0.5 \times 26.4$
a. about 30 b. about 50
c. about 40 d. about 60
- $7824 \div 24$
a. about 250 b. about 350
c. about 300 d. about 400

212



Using the Exercises

- Do all questions on page 212 together. Ask the students to say the rounded numbers they used to get an estimated answer for each problem.

PRACTICE

Solve these problems. Estimate to check your answers.

- Sandy's mother bought a new car for \$10 894. She traded in her three year old station wagon for \$4650. What was the difference that she had to pay? **\$6244**
- Lenore's father was rewiring the basement and needed to buy 48 m of electrical cable. If a metre of cable cost 46¢, how much did the cable cost? **\$22.08**
- Six friends went out for a special dinner. The bill for the dinner party came to \$262.64. They decided to split the cost. How much did each person pay? **\$43.77**
- Suzanne's father had business interests in Germany and received payment in German marks. If 1 mark is worth \$0.67 in Canadian dollars, how much is a payment of 45 marks worth? **\$30.15**

REVIEW

Multiply.

A40	1. 3.2×0.3 0.96	2. 21.4×0.2 4.28	3. 4.6×0.5 2.3	4. 48.2×0.6 28.92
A41	5. 3.1×1.3 4.03	6. 2.4×2.2 5.28	7. 5.3×3.6 19.08	8. 4.8×5.4 25.92
N18	Round to the nearest tenth.			
	9. 9.36 9.4	10. 20.54 20.5	11. 6.95 7.0	12. 32.98 33.0
A42	Divide.			
	13. $3 \overline{)2.4}$ 0.8	14. $6 \overline{)0.90}$ 0.15	15. $4 \overline{)2.64}$ 0.66	16. $5 \overline{)77.5}$ 15.5
A43	Write the equivalent decimal.			
	17. $\frac{3}{4}$ 0.75	18. $\frac{4}{5}$ 0.8	19. $\frac{1}{2}$ 0.5	20. $\frac{3}{10}$ 0.3

213

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-4	A40	202-203
5-8	A41	204-205
9-12	N18	206-207
13-16	A42	208-209
17-20	A43	210-211

Reinforcement

- Have the students estimate the cost of all refreshments and snacks for a party.
- Display several airline travel brochures. Have the students estimate the cost of a dream trip.

Enrichment

- Show jars filled with jelly beans, pennies, and paper clips. Have the students estimate how many objects are in each jar.
- Ask the students to estimate the total number of students in the school.

Extra Practice

Worksheet PS8

Pages 212-213

Solve these problems. Check your answer by estimation

- Twenty two workers at a company each contributed \$3.80 to buy a retirement gift for another worker. How much was contributed in all? **\$83.60**
- Martha's bank account was \$878.19 at the end of May and \$491.38 at the end of June. How much money had she withdrawn? **\$386.81**
- Mount Logan is 6050 m high and Mount King is 5173 m. How much higher is Mt. Logan? **877 m**
- A worker received \$306.25 for 35 h work. What was the hourly rate? **\$8.75**
- Mr. Barnardo drove 317.6 km on Monday, 406.3 km on Tuesday, and 286.1 km on Wednesday. How far did he drive on the three days? **1010 km**

Problem Solving Activities

Assign Level 5, Unit 9.

Unit 9 Objectives	Test Questions	Pages
A36	1-5	194-195
A37	6-10	196-197
A38	11-15	198-199
A39	16-20	200-201
A40	21-25	202-203
A41	26-30	204-205
N18	31-35	206-207
A42	36-40	208-209
A43	41-45	210-211
PS	46	

TEST

UNIT 9

Multiply.

1. $0.04 \times 2 = 0.08$
2. $0.08 \times 7 = 0.56$
3. $0.15 \times 5 = 0.75$
4. $0.49 \times 3 = 1.47$
5. $0.68 \times 5 = 3.40$
6. $4.11 \times 2 = 8.22$
7. $4.12 \times 5 = 20.60$
8. $3.75 \times 6 = 22.50$
9. $5.49 \times 8 = 43.92$
10. $6.53 \times 34 = 222.02$
11. $4 \times 0.2 = 0.8$
12. $9 \times 0.6 = 5.4$
13. $35 \times 0.9 = 31.5$
14. $27 \times 4.3 = 116.1$
15. $132 \times 2.5 = 330.0$
16. $0.2 \times 0.7 = 0.14$
17. $0.9 \times 0.8 = 0.72$
18. $0.3 \times 0.2 = 0.06$
19. $0.4 \times 0.5 = 0.20$
20. $0.6 \times 0.7 = 0.42$
21. $2.1 \times 0.3 = 0.63$
22. $2.4 \times 0.4 = 0.96$
23. $3.2 \times 0.8 = 2.56$
24. $25.1 \times 0.3 = 7.53$
25. $64.3 \times 0.8 = 51.44$
26. $5.4 \times 1.6 = 8.64$
27. $2.2 \times 3.1 = 6.82$
28. $8.9 \times 6.7 = 59.63$
29. $2.4 \times 9.5 = 22.8$
30. $12.2 \times 8.6 = 104.92$

Round to the nearest tenth.

31. $5.84 \rightarrow 5.8$
32. $7.89 \rightarrow 7.9$
33. $16.35 \rightarrow 16.4$
34. $19.97 \rightarrow 20.0$
35. $236.09 \rightarrow 236.1$

Divide.

36. $4 \overline{)8.4} = 2.1$
37. $5 \overline{)2.5} = 0.5$
38. $9 \overline{)18.9} = 2.1$
39. $8 \overline{)24.08} = 3.01$
40. $7 \overline{)64.54} = 9.22$

Write as a decimal.

41. $\frac{1}{2} = 0.5$
42. $\frac{1}{4} = 0.25$
43. $\frac{3}{5} = 0.6$
44. $\frac{3}{4} = 0.75$
45. $\frac{7}{10} = 0.7$

Solve.

46. A vegetable farmer sells a crate of celery for \$4.35.
How much does he get for 36 crates? **\$156.60**

Post-test

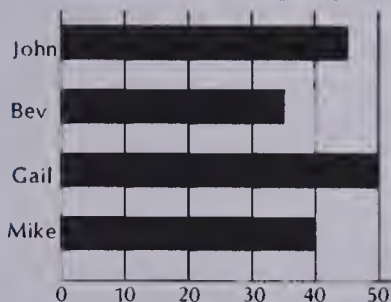
Unit 9

Multiply.

1. $0.06 \times 7 = 0.42$
2. $0.04 \times 8 = 0.32$
3. $0.13 \times 5 = 0.65$
4. $0.73 \times 9 = 6.57$
5. $0.48 \times 6 = 2.88$
6. $5.34 \times 3 = 16.02$
7. $6.85 \times 7 = 47.95$
8. $9.43 \times 8 = 75.44$
9. $3.06 \times 6 = 18.36$
10. $9.18 \times 5 = 45.90$
11. $8 \times 0.6 = 4.8$
12. $7 \times 0.5 = 3.5$
13. $26 \times 0.4 = 10.4$
14. $98 \times 0.5 = 49.0$
15. $247 \times 0.2 = 49.4$
16. $0.1 \times 0.6 = 0.06$
17. $0.3 \times 0.4 = 0.12$
18. $0.9 \times 0.5 = 0.45$
19. $0.7 \times 0.2 = 0.14$
20. $0.8 \times 0.6 = 0.48$
21. $3.7 \times 0.4 = 1.48$
22. $8.2 \times 0.5 = 4.1$
23. $6.9 \times 0.3 = 2.07$
24. $4.5 \times 0.1 = 0.45$
25. $28.3 \times 0.2 = 5.66$

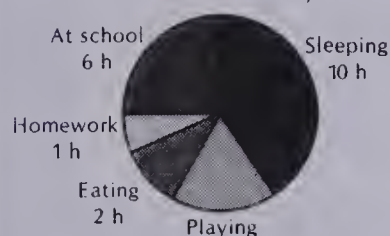
GRAPHS

Fitness Test Scores



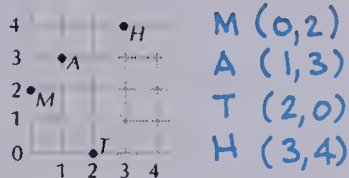
- How many points did John score? **45**
- How many points did Gail score? **50**
- Who scored the most points? **Gail**
- What is the difference between Mike's score and Bev's score? **5**

One School Day



- How many hours were spent doing homework? **1**
- How many hours were spent sleeping? **10**
- How many hours were spent playing? **5**

- Write the ordered pair for each letter shown.



Copy and complete the charts.

9. Rule: $\div 9$

In	Out
801	89
522	58
315	35
126	14
63	7

10. Rule: $+ 2, \times 2$

In	Out
28	60
41.5	87
60	124
107.8	219.6
239.2	482.4

11. Rule: $-6, \div 2$

In	Out
18	6
6	0
134	64
59	26.5
35.5	14.75

215

- $4.3 \times 1.2 = 5.16$
- $6.7 \times 5.2 = 34.84$
- $8.9 \times 3.7 = 32.93$
- $4.1 \times 1.8 = 7.38$
- $43.8 \times 0.5 = 21.9$

Round to the nearest tenth.

- 3.65 **3.7**
- 9.17 **9.2**
- 14.25 **14.3**
- 28.83 **28.8**
- 14.97 **15.0**

Divide.

- $2.1 \div 3 = 0.7$
- $0.6 \div 8 = 0.075$
- $4.1 \div 7 = 0.5857$
- $7.01 \div 6 = 1.1683$
- $9.13 \div 5 = 1.826$

Write as a decimal.

- $\frac{1}{2} = 0.5$
- $\frac{9}{10} = 0.9$
- $\frac{4}{5} = 0.8$
- $\frac{1}{8} = 0.125$
- $\frac{4}{25} = 0.16$

Solve.

- One basket of apples costs \$5.99. What do 4 baskets cost? **\$23.96**

UNIT 10

Geometry

Theme: Amusement Park

Lesson		Objective	Pages
Preview		Review of three-dimensional solids.	217
1	G1	Identify and name points and vertices, line segments, lines, and rays.	218–219
2	G2	Identify the lines of symmetry of plane figures.	220–221
3	G3	Identify plane figures (polygons).	222–223
4	G4	Describe a slide on a coordinate grid.	224–225
5	G5	Identify and describe a flip of a plane figure over a line.	226–227
6	G6	Identify and describe a quarter turn, a half turn, and a three-quarter turn image of a plane figure about a point.	228–229
7	G7	Identify plane figures that have the same shape and the same size (congruent figures).	230–231
8	G8	Name corresponding sides and corresponding vertices of congruent polygons.	232–233
9	G9	Identify and construct tiling patterns (tessellations).	234–235
10	PS9	Solve problems involving diagrams.	236–237
Test		Geometry	238
Preview		Multiplication	239

About This Unit

Geometry includes the study of plane figures that represent objects in the real world and of the properties of these figures: shape, size, symmetry, angles, lengths of sides, area, congruence, and so on. The lessons of this unit should involve concrete situations and build upon previously learned facts, skills, and properties. References should be made to real-life examples whenever possible so that students become aware of the geometric properties of objects in their environment. The use of concrete materials should precede and accompany the use of the textbook lesson and follow-up suggestions. A complete geometry lesson may take two or three days of classroom time and should generate student involvement beyond the exercises that are possible on a static, textbook page.

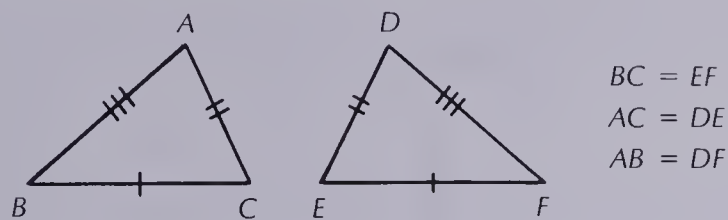
It may be advisable to do parts of the lessons in smaller sections at different times of the year. If the unit is done in one sequence of lessons, bulletin board displays and activities should be continued for the rest of the school year. Many of the ideas associated with patterns and symmetry should be extended to art lessons.

Congruence is central to the unit. The motions of slides, flips, and turns studied here preserve the size and the shape of geometric figures. This idea is present throughout the unit. Students should be able to test for congruence by using tracing paper and by recognizing and performing slides, turns, and flips and combinations of these. When figures are drawn on grids or dot paper, abler students may recognize congruence without actually making tracings.

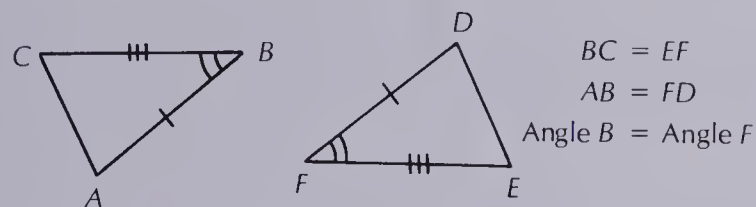
No attempt is made at this level to teach congruence of triangles in the formal, geometric sense. For generating exercises and discussion the teacher should be aware of the minimum requirements for congruence, although students are certainly not expected to recognize them.

Two triangles are congruent if:

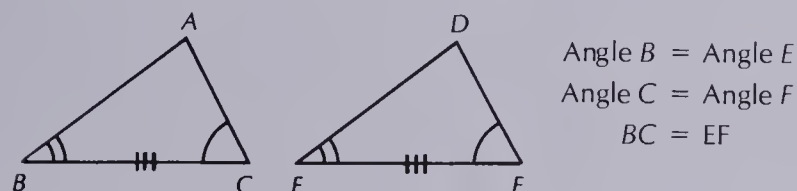
1. All three pairs of sides are equal.



2. Two sides and their contained angle are equal.



3. Two angles and a side are equal to the corresponding parts of another triangle.

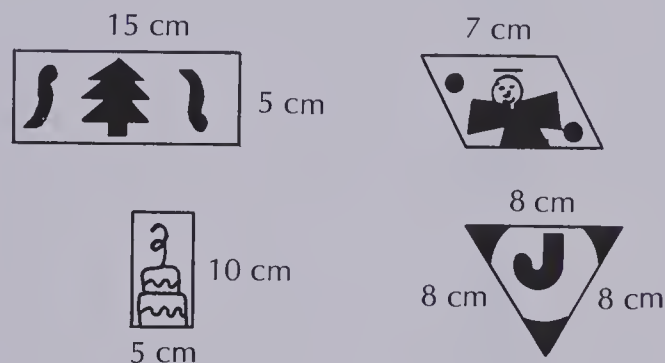


Ideas

Wrapping Paper: Printmaking with Tessellations

During the first days, investigate tessellations with cardboard figures as discussed in Lesson 9.

Work a large chunk of Plasticene until it is pliable. Carefully flatten one of the sides (faces). Use templates or cardboard figures to help you cut out several of the pieces shown below. With different utensils carve designs on the flat surface. Since white is an essential component of prints, the area of the valleys should just equal that of the plateau.



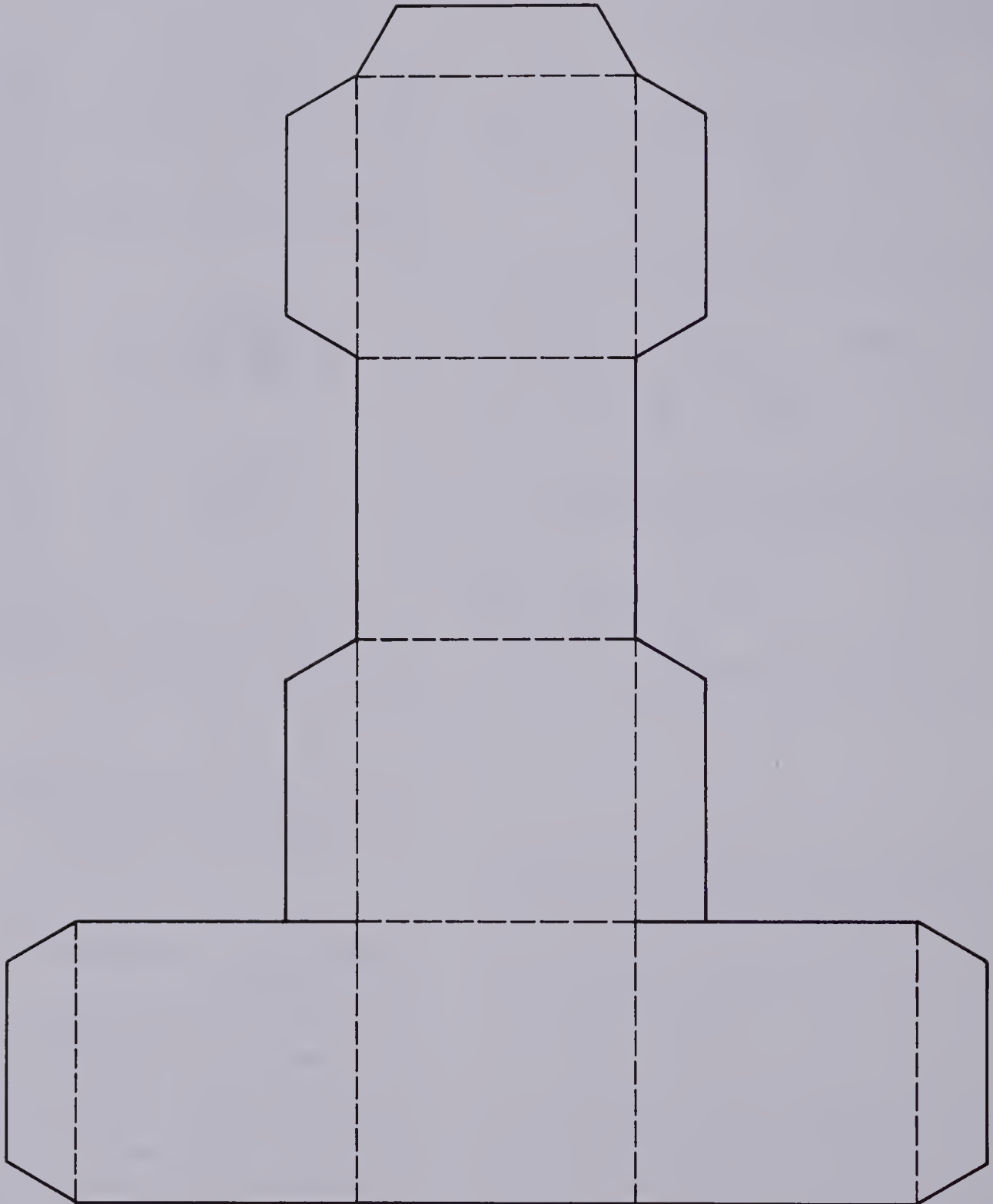
Place all the carefully cut Plasticene in a printmaking centre. Let the students use their knowledge of tessellating gained from the lesson to produce wrapping paper.

Students will need to experiment with the amount of paint to apply (at each step) to the Plasticene surface, and they will need to handle the Plasticene print blocks gently.

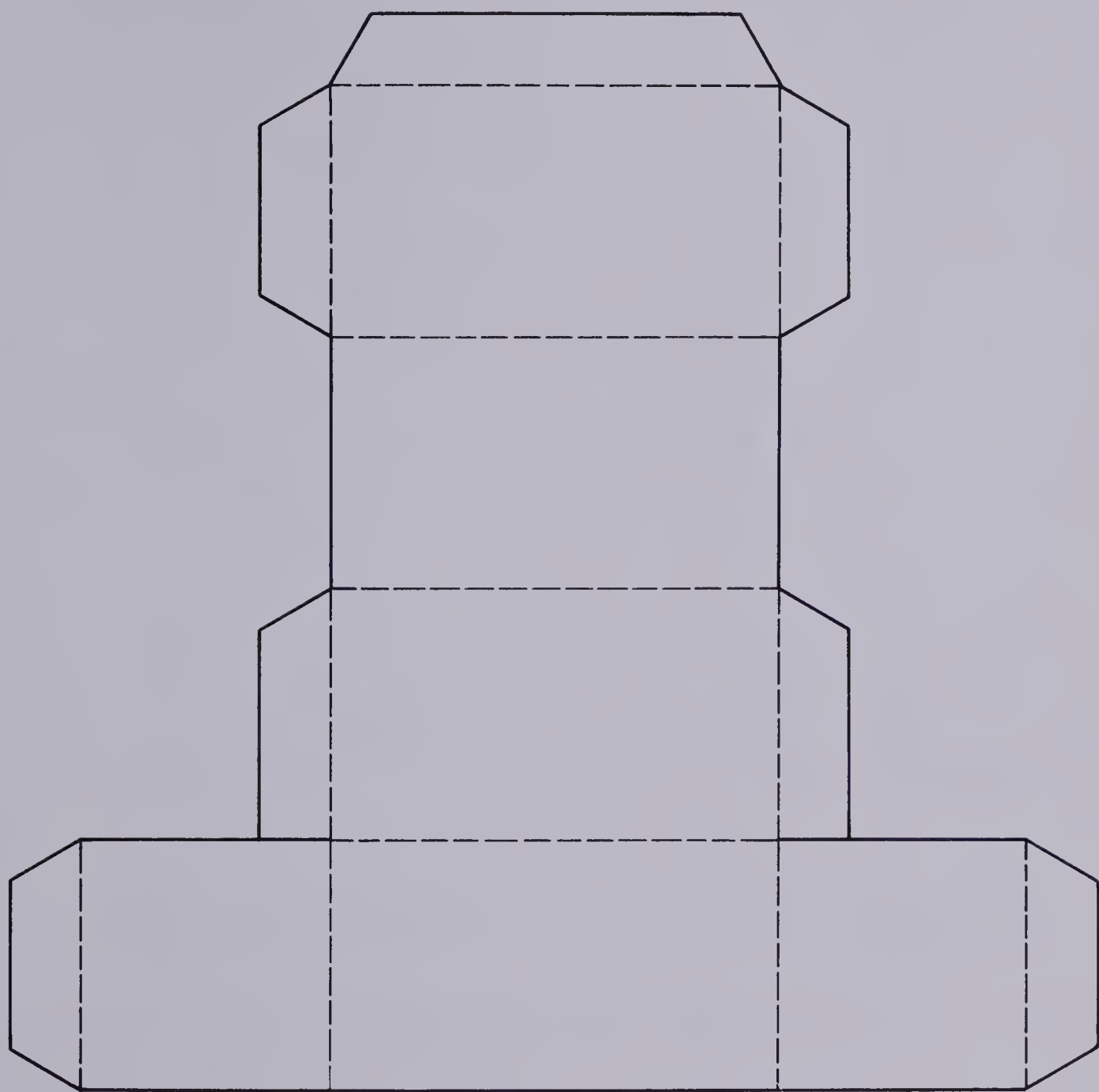
Construction of 3D Shells from Given Patterns

Use the nets provided with this unit. They may be reproduced and distributed to the students. Alternatively, make an overhead for each net and project it on the wall. Tape construction paper to the wall where the pattern is projected. Trace the pattern as accurately as possible. One student can cut, fold, and tape (or glue) the pattern into the shell of a 3D solid. This procedure provides larger, more durable shells than the ones students are usually asked to work with.

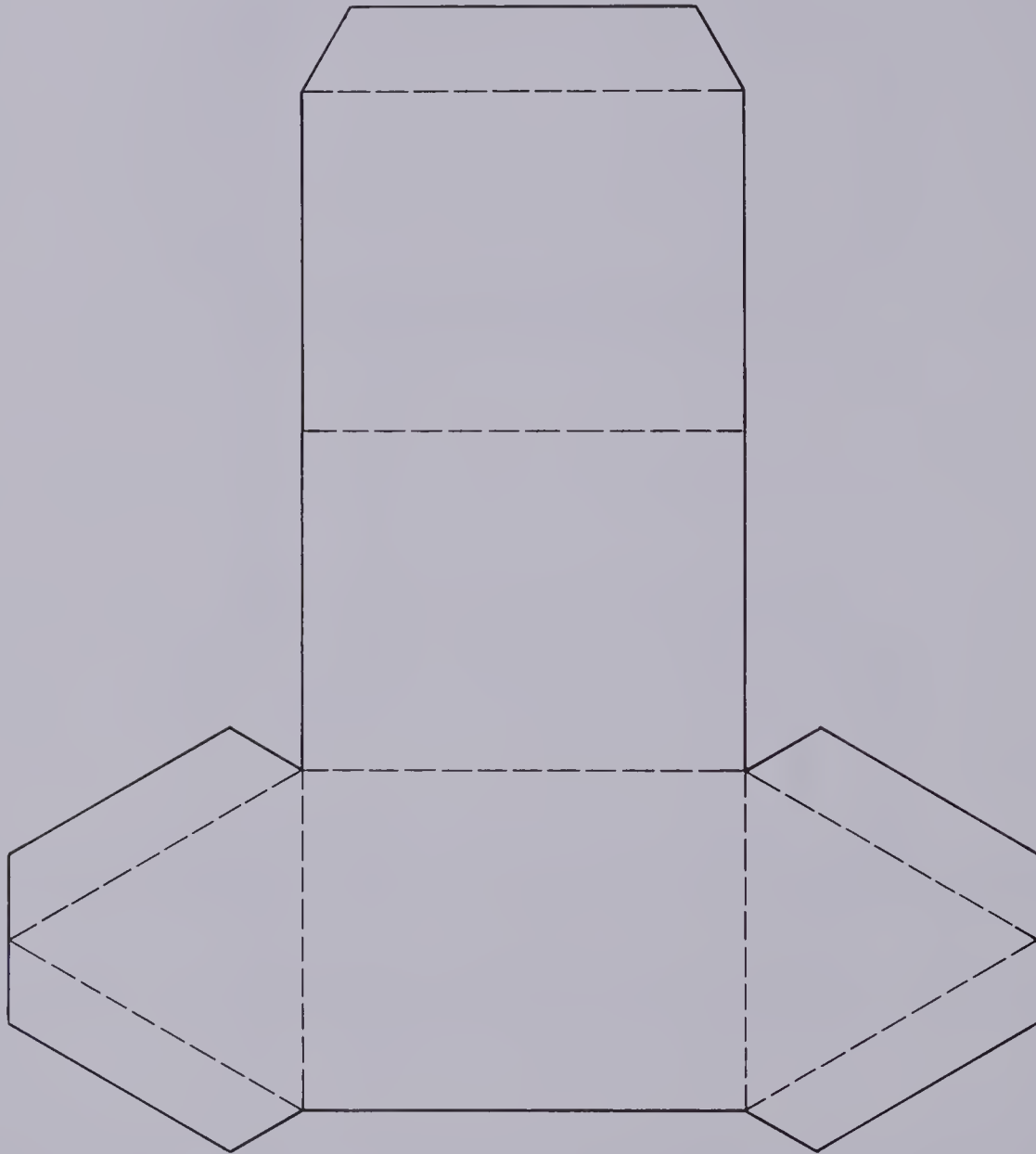
Cube



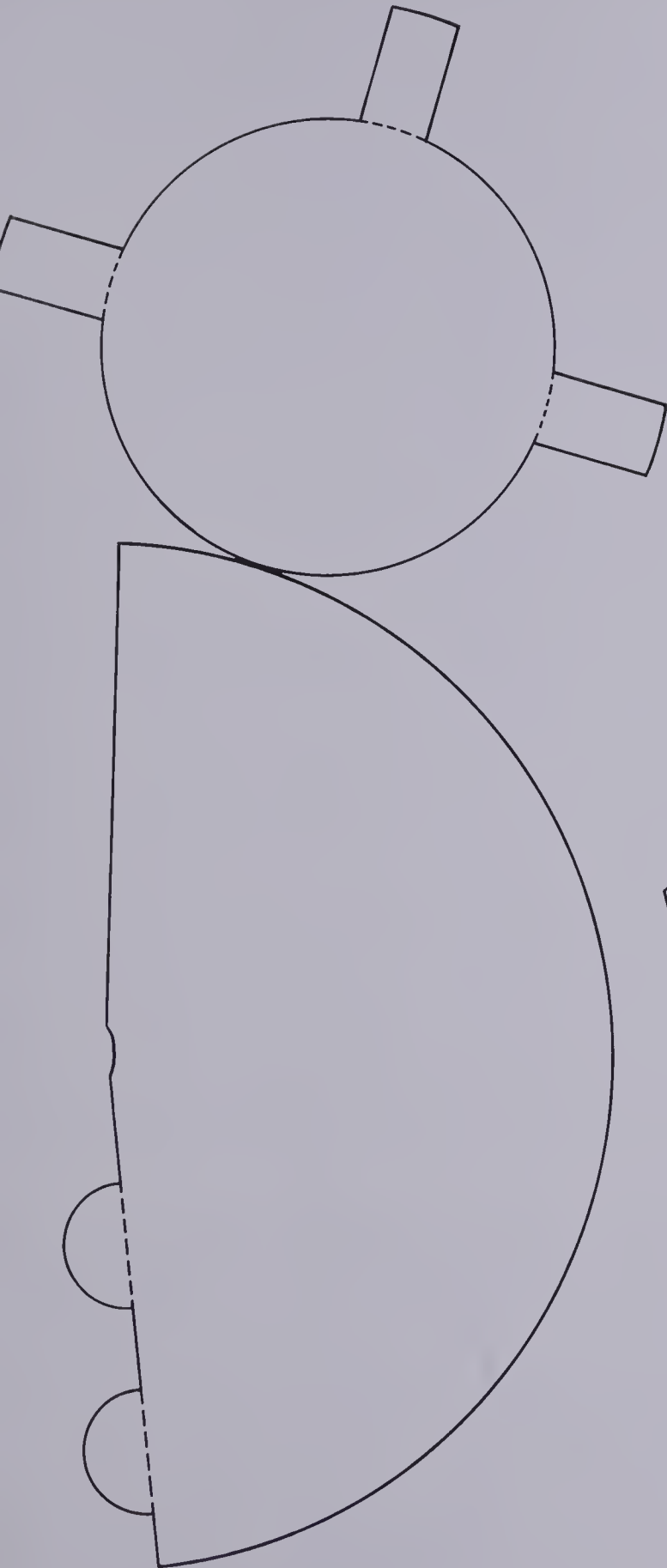
Rectangular Prism



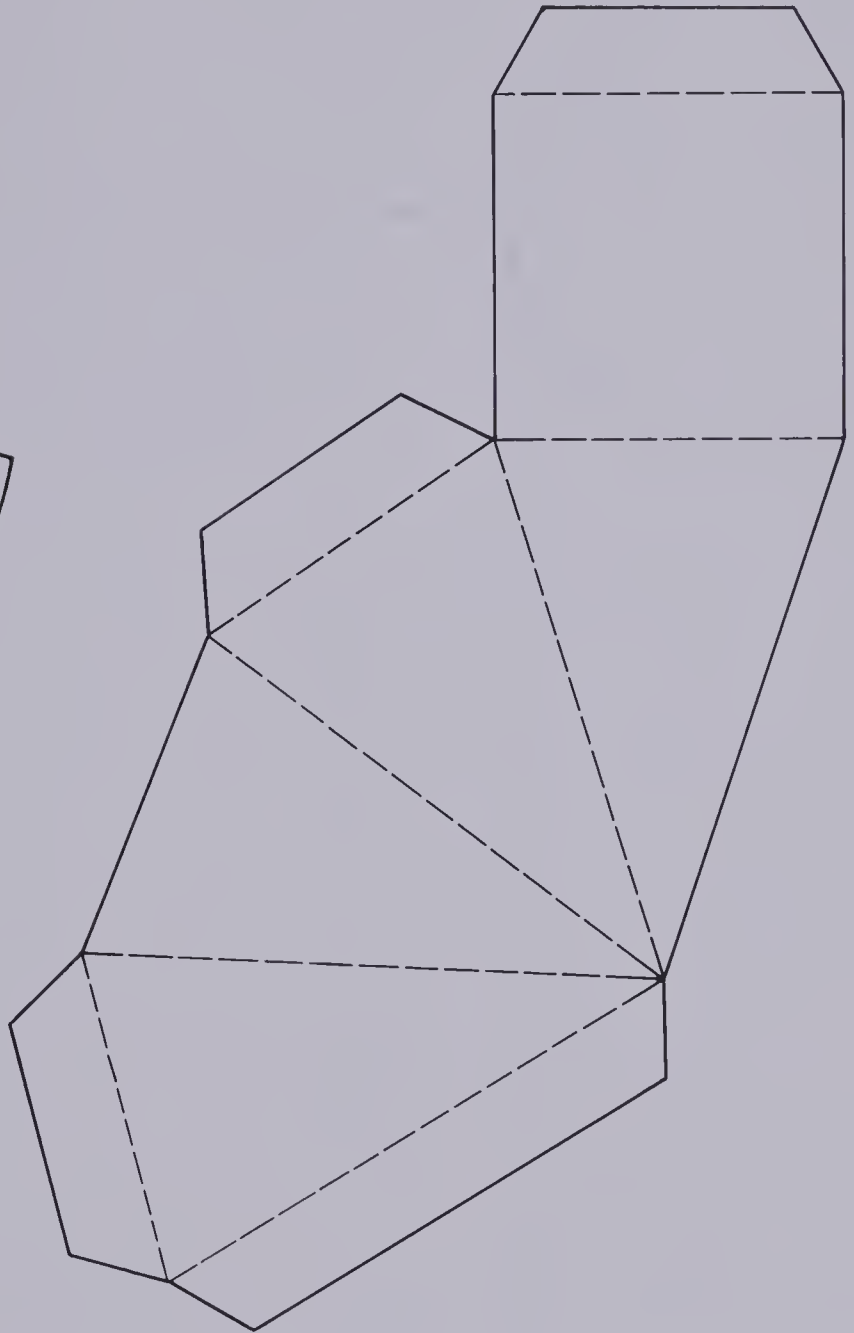
Triangular Prism



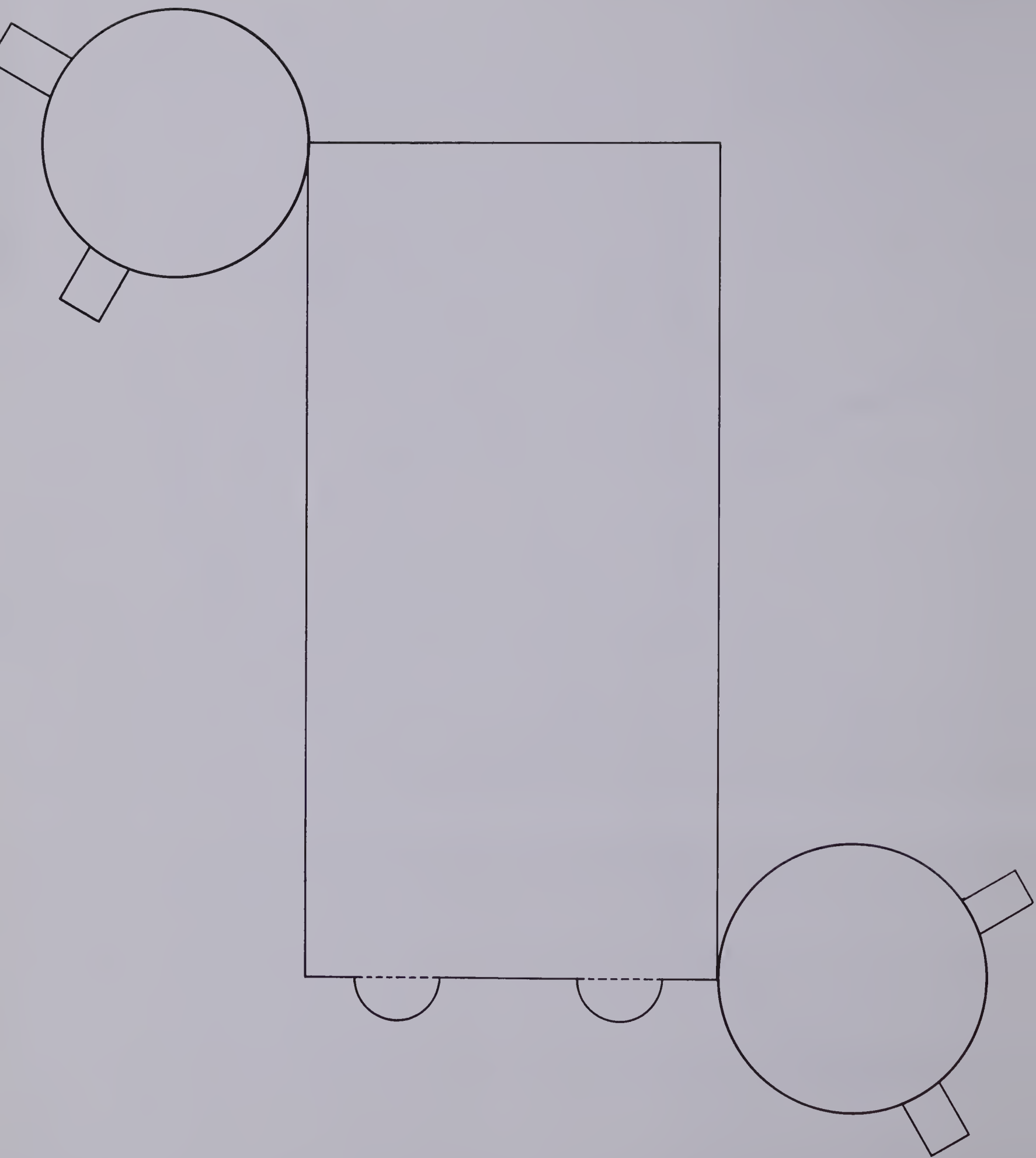
Cone



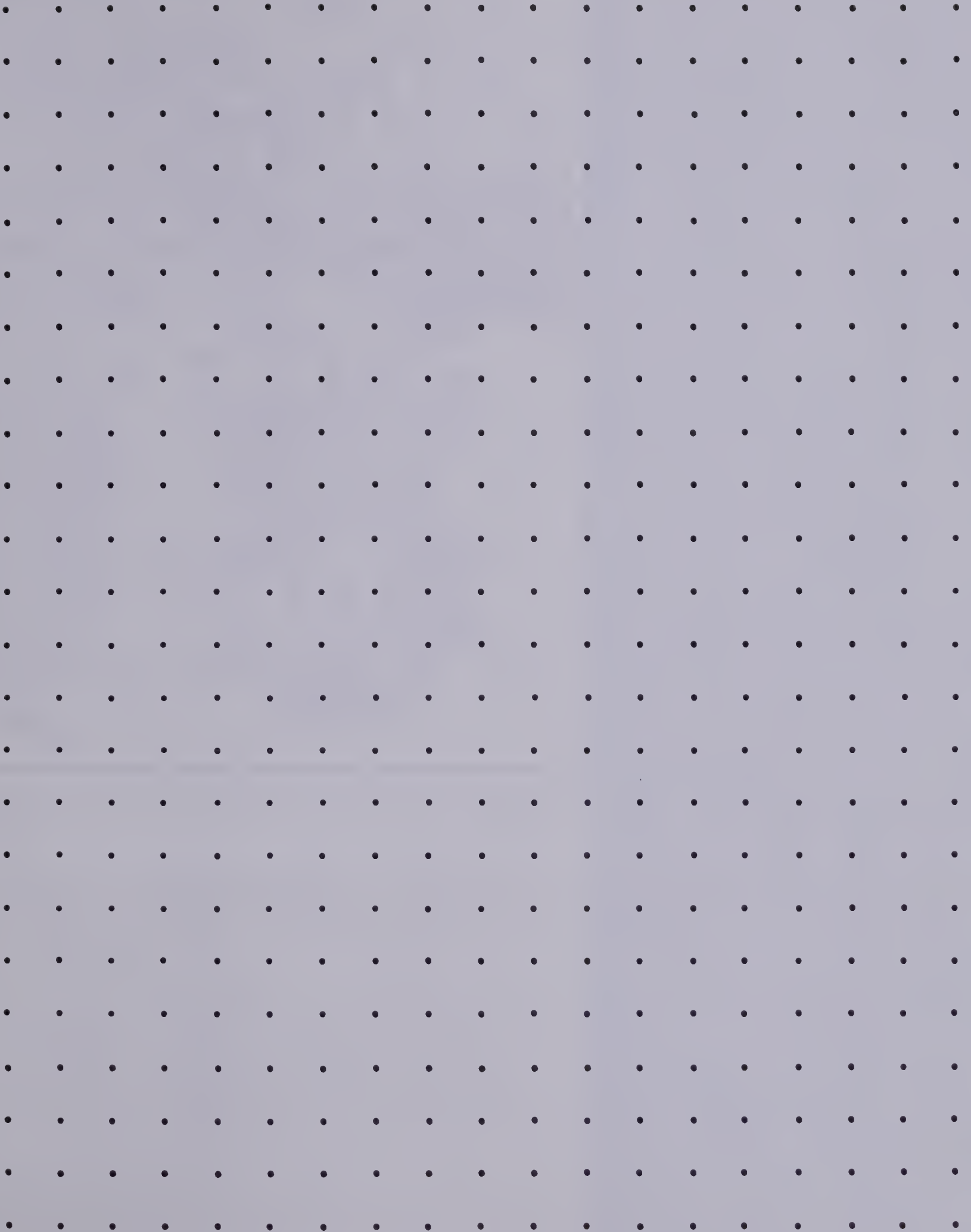
Square-based Pyramid



Cylinder



Dot Paper



UNIT 10

GEOMETRY



Unit 10 Objective	Test Questions	Pages
G1	1-5	218-219
G2	6-9	220-221
G3	10-11	222-223
G4, G5, G6	12-15	224-229
G7	16-18	230-231
G8	19-21	232-233

Pretest

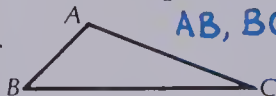
Draw an example of each.

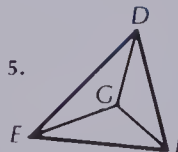
1. point A $A \cdot$

2. line segment PQ

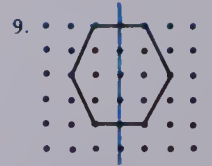
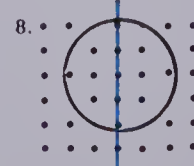
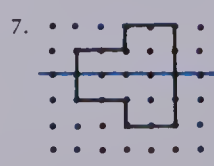
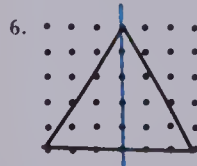
3. ray XY

Name all the segments in each figure.

4.  AB, BC, AC

5.  DG, EG, FG
 ED, DF, FE

Draw a line of symmetry.



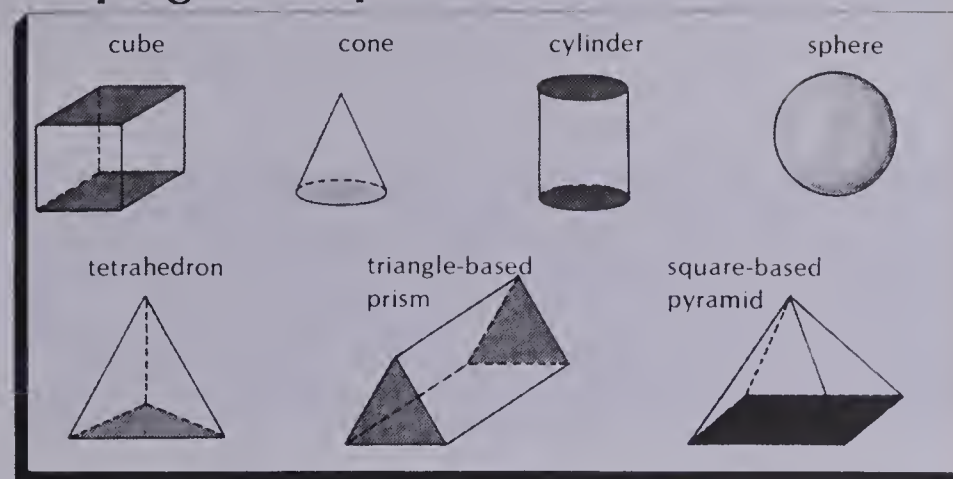
10. Draw a pentagon.



11. Draw a hexagon.



Keeping in Shape



Match each object with each geometric solid.

- Hat **Cone**
- Juice Can **cylinder**
- Balloon **sphere**
- Roof Top **Triangle based prism**
- Pop Corn **cone**
- Straw **cylinder**
- Lunch Box **cube**
- Monkey Bars **Tetrahedron**

9. The geometric solids above have several kinds of faces. Make a chart telling about the faces of the solids.

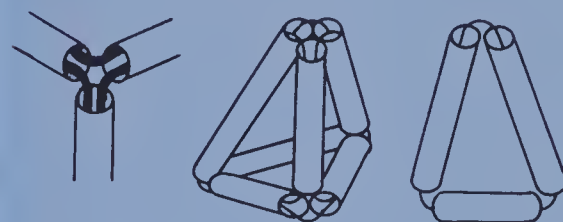
217

UNIT 10

PREVIEW

Suggestions

Review with the students the names of the geometric solids at the top of page 217. Use models. Review faces, edges, and vertices (corners) of these solids. Have students construct skeleton models with pipe cleaners and straws.



Explore the relationships:

$$E = F + V - 2$$

(See page 123)

edges faces vertices

Review the names **tetrahedron**, **prism**, and **pyramid** and the characteristics of the solids that they identify. These solids and their names are introduced in Books 1 to 4 of the *Houghton Mifflin Mathematics* program, but they may need a careful introduction for those students who are new to the program or who may have forgotten their names. *Tetra* means "four"; a tetrahedron has four flat faces, each of which is a triangle.

Discuss prisms and pyramids. How are they alike? How are they different? What is another name for a tetrahedron? (triangle-based pyramid). Draw or make a skeleton model of a square-based prism, a pentagon-based prism, and so on.

How do cylinders, cones, and spheres differ from the other solids? (The others have edges and their surfaces are flat.) Give students patterns or nets to construct shell models of various solids.

About the Page

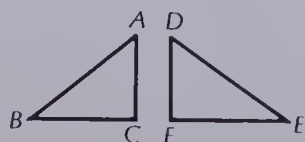
The matching of the abstract drawings and the real objects can be done before the activities to determine students' weaknesses. Alternatively, the exercise may be assigned as a follow-up to the above activities.

Draw the image.

- Slide: right 2, down 3
- flip line
- $\frac{1}{2}$ turn
- flip line

Draw a congruent figure.

-
-
-



Name the matching part.

- A and D
- B and E
- BC and FE

Objective G1

Identify and name points and vertices, line segments, lines, and rays.

Introducing the Lesson

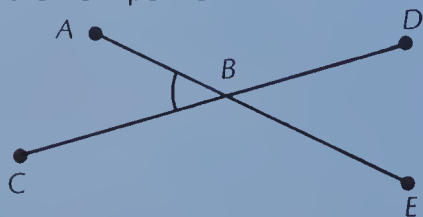
Draw several segments on the chalkboard both straight and curved. Ask the students to identify the straight segments. Use string to show that the straight segment is the shortest distance between two points.

Teaching the Lesson

The vocabulary of this lesson has been taught in earlier grades. However, review it to be sure that the students understand it. Point out that a **segment** has **two endpoints**. A **ray** has only **one endpoint** and continues forever in one direction. An arrow is drawn on one end to indicate this. A **line** continues forever in two (opposite) directions.

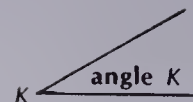
The focus of this lesson is on the labelling of the geometric figures. A point is usually labelled with a capital letter. An angle is labelled with a letter at the vertex. (Angles were previously discussed in Unit 5, Objectives M11 and M12 on pages 112 to 115.) Sometimes, to avoid confusion, three letters are used to label angles. The angle marked below is angle ABC. (Angle B would not give enough information to distinguish any one of 4 angles.)

Two points are used to label segments, rays, and lines. Assume that a *straight* segment and a straight line are meant unless noted otherwise. The sides of geometric figures are labelled in reference to their endpoints.

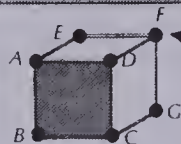
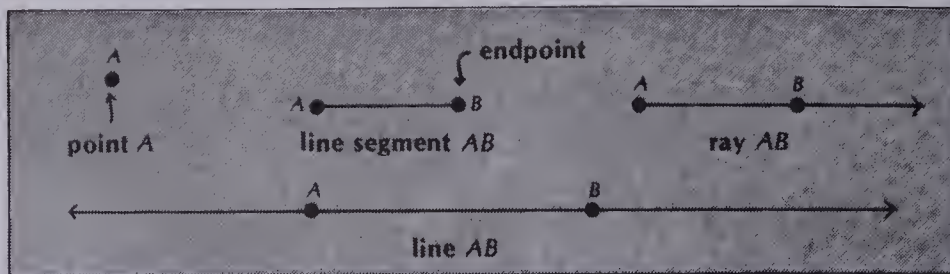


Points and Lines

In Unit 5, we learned to *label* an angle using a letter at its vertex.

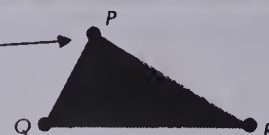


We also label points and lines to help us talk about them.



Segment BC is an edge of the cube.

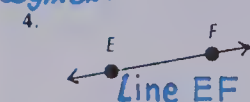
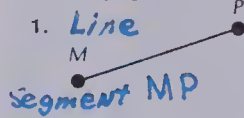
These points are **vertices**. (One is a **vertex**.)



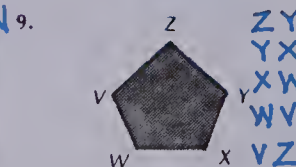
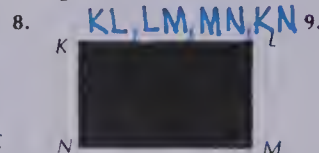
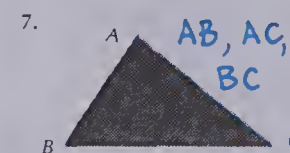
Segment QR is a side of the triangle.

EXERCISES

Name each.



Name all the sides of each figure.



Using the Exercises

- In questions 1 to 6, make sure the proper vocabulary is used. Point out (in questions 3 and 6) that it is usual to label a ray by starting at the endpoint. Question 3 is ray CD (not DC) and question 6 is ray SG.
- Make sure all the sides are named in each of questions 7, 8, and 9.

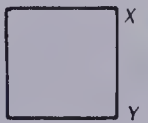
PRACTICE

Draw each of the following.

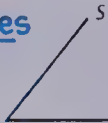
- a ray AB
- a point Q
- a line segment XY
- a line JK
- an endpoint F
- an angle Q
- two line segments EF and GH that intersect at point T
- a vertex R that is part of figure RST
- two rays MN and MP that form angle M

Name all the line segments and vertices in each figure.

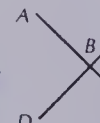
10. Seg.
WX, XY,
YZ, ZW



11. Vertices
W, X
Y, Z

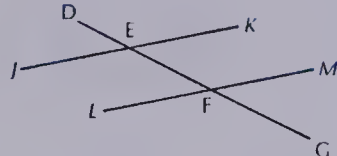


12. Seg.
ST, TV
Vertex
T



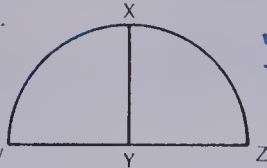
Seg.
AB, BE
BC, BD
EBD, ABC
Vertex
B

13.



Seg.
WX, XZ
WXZ, WY
YZ, WYZ

14.



Vertex
Y

15. Name the angles for the figures in problems 10 and 11.

Assigning the Practice

Minimum: 1-12

Average: 1-14

Enriched: 1-15

Reinforcement

Ask the students to make bulletin board displays of pictures and names of real-world objects that suggest segments, rays, and lines.

Segments: T.V. antennas, rulers, pins.

Rays: light beams, gunshots.

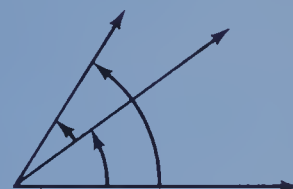
Lines: Discuss the students' suggestions.

There are no real examples of lines that go on forever in two directions.

Enrichment

1. Assign *Perpendicular and Parallel* on page 219. Discuss parallel lines. Point out that two segments on a flat surface are parallel if they will never intersect, no matter how far they are extended. They are always the same distance apart. Show that lines in three-dimensional space, however, may not be parallel and still not intersect.

2. How many angles are formed in this figure?



3

In this figure?



6

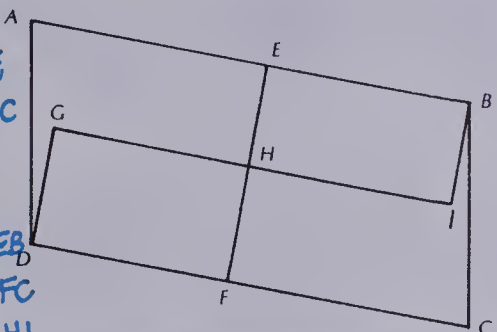
Investigate the pattern as more segments are added, starting from the same points.

Segments: 2 3 4 5 ... N
Angles: 1 3 6 10 ... $\frac{N \times (N-1)}{2}$

2

Perpendicular and Parallel

Find perpendicular and parallel line segments in the figure.



10. W, X, Y, Z
11. T



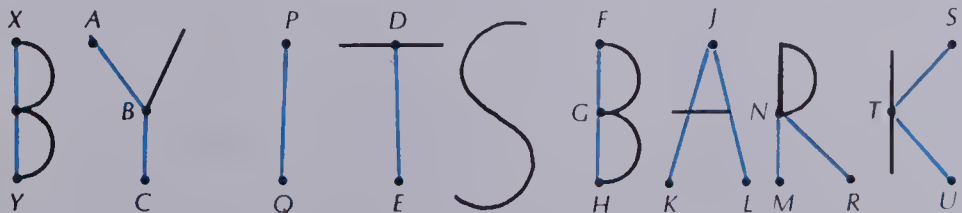
219

Extra Practice

How do you recognize a dogwood tree?

Draw these segments to find the answer

AB DE FG MN ST PQ JK NR BC
XY JL TU GH



Worksheet G1

Pages 218-219

Objective G2

Identify the lines of symmetry of plane figures.

Introducing the Lesson

Sketch the following on the board.



Which face looks "evenly balanced"? Why? Discuss with the students how balance is pleasing to the eye. Refer to other examples in the environment.

Teaching the Lesson

Give each student a sheet of paper. Ask them to fold it in half. Using a soft lead pencil or chalk, the students draw half a heart and a spot on one side of the fold. Then they fold the drawing along the same crease but with the image inside and rub the paper to transfer the image to the paper it now faces.

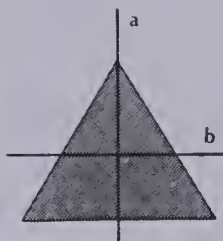
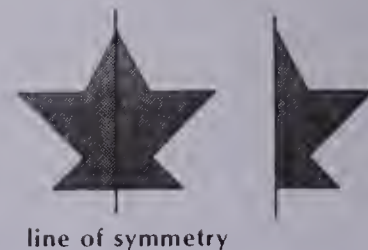


Very thin tracing paper may be used similarly. When they open up the paper the students draw the second half of the image along the lines left from making the first impression. Discuss that the second half of the heart is a flip copy of the first half. When the paper is folded on the same crease, one half fits exactly on the other half. We describe this type of form as **line symmetry**. The crease is the **line of symmetry**. Provide copies of figures showing line symmetry (isosceles triangle, happy face, flower, etc.) with the line of symmetry drawn. Ask them to fold along the line and observe whether one half fits exactly on the other. The students can trace the figures and lines at the top of page 220 and similarly check for line symmetry. Alternatively, they may use a *MIRA*, if available, and check for symmetry by placing the *MIRA* on the lines drawn on the textbook page. A mirror may also be used.

Symmetry

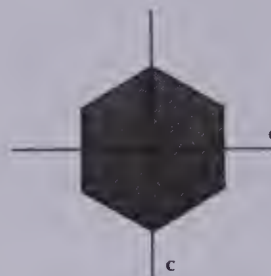
If a figure can be folded on a line so one half fits exactly on the other, the figure is **symmetric**.

The line is called a **line of symmetry**.



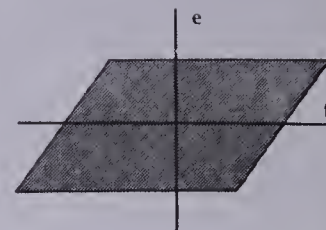
Line **a** is a line of symmetry.

Line **b** is not a line of symmetry.



Lines **c** and **d** are both lines of symmetry.

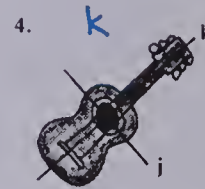
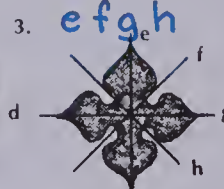
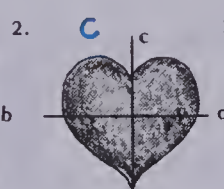
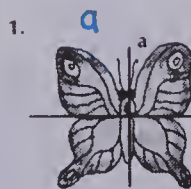
This figure has other lines of symmetry.



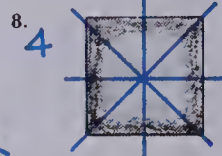
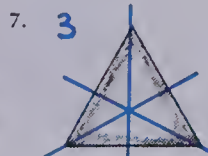
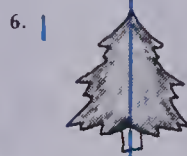
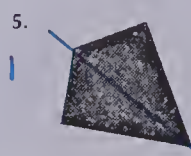
Neither line **e** nor **f** is a line of symmetry.

EXERCISES

Which are lines of symmetry? Use tracing paper.



How many lines of symmetry does each figure have?

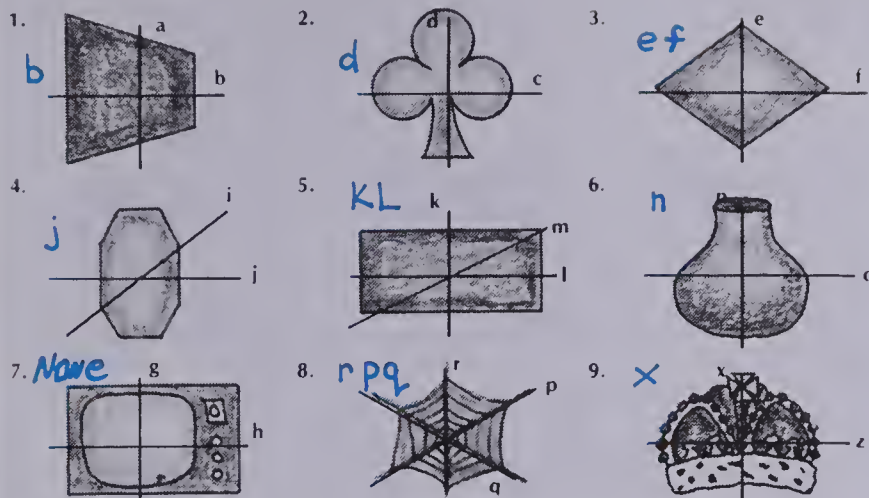


Using the Exercises

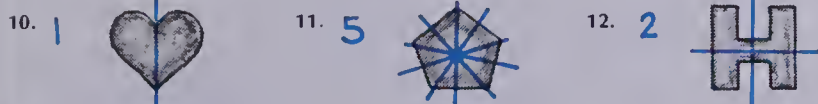
- In questions 1 to 4, tracing is suggested, but a *MIRA* may also be used.
- The figures in questions 5 to 8 should be traced so that students can experiment to find *all* the lines of symmetry. However, a *MIRA* can be used with their tracing in order to investigate symmetry.

PRACTICE

Which are lines of symmetry? Use tracing paper



How many lines of symmetry does each figure have?

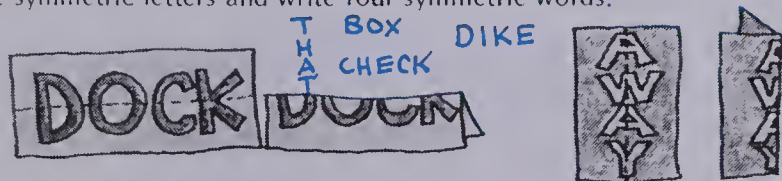


A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

13. List the capital letters that have one line of symmetry.
14. List the capital letters that have two or more lines of symmetry **H I O X**
15. List the capital letters that have no lines of symmetry. **F G J L N P Q R S Z**

Symmetric Words 13. ABCDEKMTUVWY

Use symmetric letters and write four symmetric words.



Write a word that does not have any symmetric letters.

Can't be done using all capital letters—all capital vowels have at least one line of symmetry. Using lower case; examples, Ran, Fan, Pen, ...

221

Assigning the Practice

Minimum: 1-9
Average: 1-15
Enriched: 1-15

Reinforcement

1. Assign *Symmetric Words* on page 221.
2. Ask students to look for examples of symmetry in objects and pictures around the classroom.
3. Which digits from 0 to 9 have lines of symmetry? (0, 1, 3, 8—some depending on how they are drawn.)
4. Use elastics to make symmetric figures on a geoboard. Alternatively, draw symmetric figures, and their lines of symmetry, on dot paper.
5. Have students draw symmetric figures on dot paper and reproduce the figures on a geoboard.

Enrichment

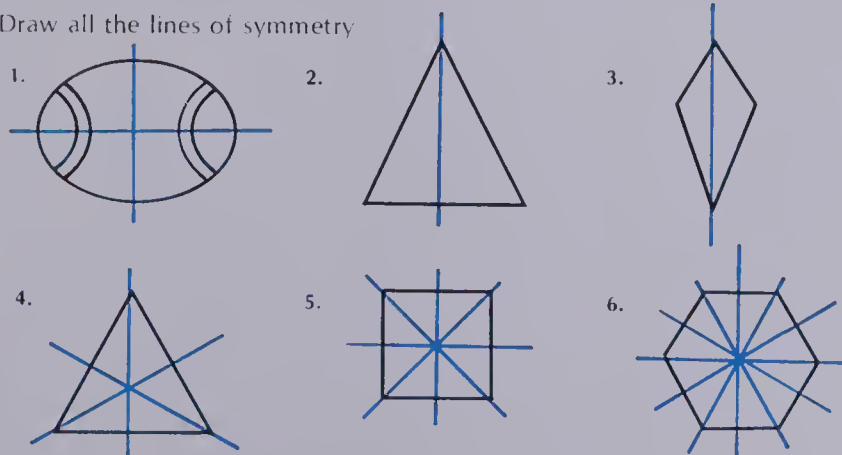
1. Write five-, six-, and seven-letter words that have line symmetry.
2. Discuss the circle. How many lines of symmetry does a circle have? (There are infinitely many. Any line that passes through the centre is a line of symmetry.)

Extra Practice

Worksheet G2

Pages 220-221

Draw all the lines of symmetry



UNIT 10 LESSON 3

Objective G3

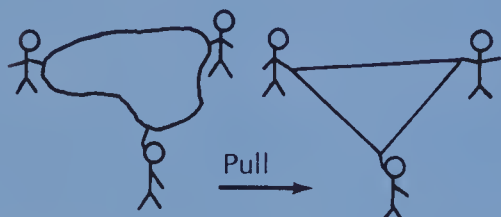
Identify plane figures (polygons).

Introducing the Lesson

Place a 30 cm string on an overhead projector. Tell the students that it represents a curve. Rearrange the string in a variety of shapes. Take a second 30 cm string. Join the ends together and place it on the overhead. Ask, "How do the curves differ?" *One is closed and one is open.* Point out that a closed curve has an inside and an outside. Show the closed curve in various shapes.

Teaching the Lesson

Ask a student to make a closed curve with a 4 m string. Ask three students to hold the closed curve and gently pull until it is taut. Ask, "Is it still a closed curve?" Yes. Stress that mathematicians still call it a **curve** even though the edges are straight. Ask "What figure is it?" *Triangle.* "How many sides does it have? How many angles?" Lead the students to conclude that a triangle is a closed curve with 3 straight edges and 3 vertices.



Repeat the activity with 4, 5, and 6 students and define **quadrilateral**, **pentagon**, and **hexagon**. Refer to the illustrations in the textbook lesson example.

All these figures are called **polygons**. *Poly* means "many". A polygon with all its sides of equal length is called **regular**. An equilateral triangle and a square are regular polygons.

Point out that a rectangle is a special kind of quadrilateral, and that a square is a special kind of rectangle.

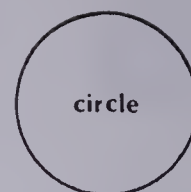
A circle is a special kind of closed curve that is perfectly round. Every point on the circle is the same distance from its centre.

Polygons

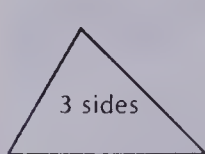
Open curves have two endpoints.



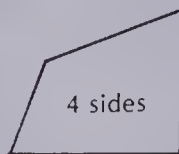
Closed curves have no endpoints.



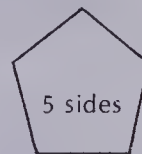
Polygons are closed curves with straight sides.



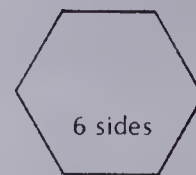
triangle



quadrilateral



pentagon



hexagon

EXERCISES

Name each figure.

1.



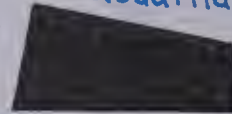
Triangle

2.



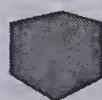
Pentagon

3.



Quadrilateral

4.



Hexagon

5.



Quadrilateral

6.



Hexagon

7.



Circle

8. Which figure has 3 sides and 3 vertices? **1**
9. Which figure has 5 sides and 5 vertices? **2**
10. Which figure has 6 sides and 6 vertices? **4, 6**
11. Which figure has 4 sides and 4 vertices? **3, 5**
12. What is the name for a quadrilateral with a right angle at each vertex? **Rectangle**
13. What is the name for a quadrilateral with four right angles and four sides of equal length? **Square**


Using the Exercises

- Make sure the students recognize all the figures and that they spell them correctly.


PRACTICE

For each figure, make a chart to answer the following questions.


- How many sides does the figure have?
- How many vertices or angles does the figure have?
- How many lines of symmetry does each figure have?

- 

quadrilateral

a. 4
b. 4
c. 0
- 

rectangle

a. 4
b. 4
c. 2
- 

square


a. 4
b. 4
c. 4
- triangle with no equal sides

a. 3
b. 3
c. 0
- triangle with two equal sides

a. 3
b. 3
c. 1
- triangle with three equal sides

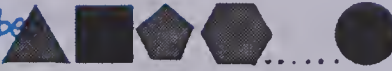
a. 3
b. 3
c. 3
- Melvin thinks a circle has 4 lines of symmetry. What do you think?

An infinite number


- Marsha drew this pattern to go from polygons to the circle.

What is her idea?

Increase number of sides and vertices



Faces, Edges, and Vertices

A **face** of a solid is a flat surface.
Copy and complete the chart.

Solid	Kinds of Faces	Number of Faces	Number of Vertices	Number of Edges
cube	squares	6	8	12
tetrahedron	triangles	4	4	6
triangle-based prism	triangles rectangles	5	6	9
square-based pyramid	triangles square	5	5	8



Add the number of faces and vertices for each solid. Do you notice a pattern?

223

Assigning the Practice

Minimum: 1-6

Average: 1-7

Enriched: 1-8

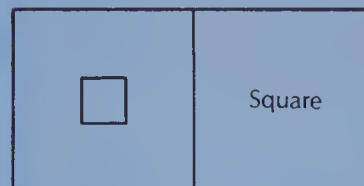
Reinforcement

1. Use straws and pipe cleaners to make models of polygons. Alternatively, make models with elastic bands and geoboards or draw them on dot paper.

2. Ask students to prepare a chart to classify various polygons and list numbers of sides, vertices, angles, and lines of symmetry, especially for regular polygons.

3. Make a domino game.

Label cards, a picture on one side and a name on the other (polygon, quadrilateral, rectangle, triangle, square, etc.).




Enrichment

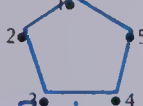
Assign *Faces, Edges, and Vertices* on page 223. Prompt students to generate the relationship: $E = F + V - 2$

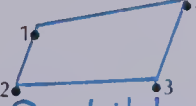
Test the relationship on odd solids, like the cone and cylinder. Does it still work? (No.)


Extra Practice


Join the dots and name each polygon.

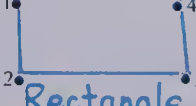
- 

Triangle
- 

Pentagon
- 

Quadrilateral
- 

Square
- 

Pentagon
- 

Rectangle

Worksheet G3

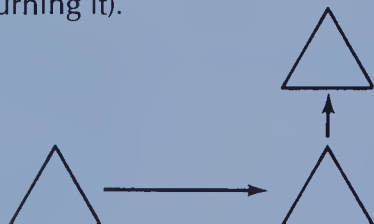
Pages 222-223

Objective G4

Describe a slide on a coordinate grid.

Introducing the Lesson

Stick a triangle (or any figure) on the board. Ask the name of the figure. Slide a tracing of it along the board (without turning it).



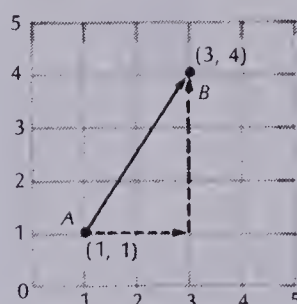
Ask, "Does the image triangle have the same shape?" Yes. Slide it again and ask the same question. Repeat the above with other figures. Have the students conclude that the figure does not change in shape and size when we change its position by a slide.

Teaching the Lesson

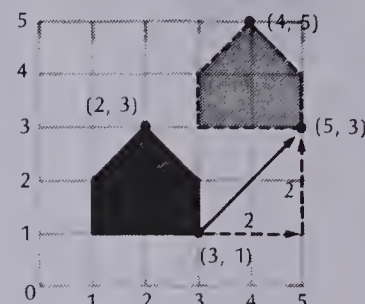
Sketch a grid on the board. Label the axes from 1 to 5. Draw a mouse at point (2, 1), a mouse hole at (3, 3), and cheese at (5, 4). Review the meaning of the coordinates — the first number is the distance from 0 to the right; the second number shows the distance up to the point. Tell the students that the mouse must walk on the lines. Show the mouse moving right 1 and up 2 to get to the hole. Ask the students to explain how the mouse can get to the cheese (3 right, 3 up). Emphasize naming distance to the right (or left) first, then distance up (or down).

Discuss the examples in the textbook. Redraw the grids on the board. Draw the point (1, 1) on one grid and the red pentagon on the other. Demonstrate the slides. Ask for the original coordinates and the coordinates of the image for each vertex of the pentagon. Demonstrate that each example represents a single (diagonal) slide, but we describe each by two slides — over and up.

Slides



Starting at point A, move right 2 and up 3 to point B. Point B is the **image** of point A after a **slide**.



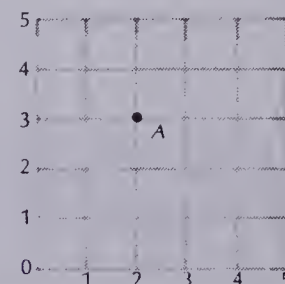
The blue pentagon is the **image** of the red pentagon after a **slide** of **right 2 up 2**.

EXERCISES

Point A is at (2, 3).

Name the coordinates of its image after these slides.

- right 2, up 1 **(4, 4)**
- right 3, down 2 **(5, 1)**
- right 1, down 3 **(3, 0)**
- right 3 **(5, 3)**
- left 1, up 2 **(1, 5)**
- left 2, up 1 **(0, 4)**
- left 1, down 2 **(1, 1)**
- down 3 **(2, 0)**



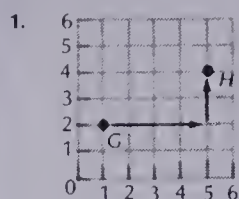
224

Using the Exercises

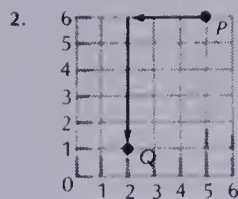
- If necessary, draw a grid on the board to demonstrate the slides in the exercises. After determining each image point, draw a diagonal arrow to show the resultant slide (questions 1 to 3 and 5 to 7).

PRACTICE

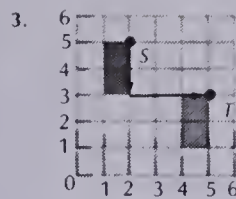
Name each slide.



right 4, up 2



left 3, down 4



down 2, right 2

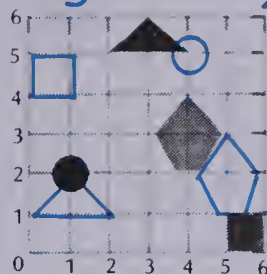
Copy the graph. Slide the figure as indicated and draw the image.

4. Slide left 2, down 4

5. Slide right 3, up 3.

6. Slide left 5, up 4.

7. Slide right 1, down 1



REVIEW

G1

Draw each

1. ray AB



2. line MN



3. line segment PQ



G2

Copy each letter.

Draw any lines of symmetry you can find.



G3

Draw each.

8. a triangle



9. a quadrilateral



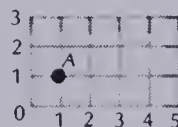
10. a hexagon



G4

11. Name the image of point A after sliding it right 4 and up 2.

(5, 3)



Assigning the Practice

Minimum: 1-3

Average: 1-7

Enriched: 4-7

Review Exercises

Questions	Objective	Pages
1-3	G1	218-219
4-7	G2	220-221
8-10	G3	222-223
11	G4	224-225

Reinforcement

Using dot paper, have students draw polygons and their slide images. Ask them to write a description of each slide (right _____, up _____).

Enrichment

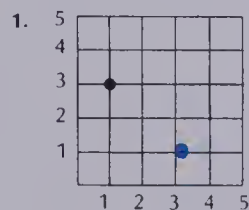
Ask the students what the image is. Do not let them use grids.

Point	Slide	Image
(1, 3)	up 2	(,)
(2, 2)	right 4	(,)
(3, 5)	right 4, up 2	(,)
(1, 4)	down 2	(,)
(5, 4)	left 3	(,)
(4, 3)	left 3, down 2	(,)
(3, 3)	left 2, up 1	(,)
(2, 3)	right 3, down 2	(,)

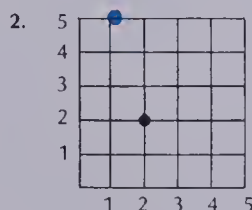
225

Extra Practice

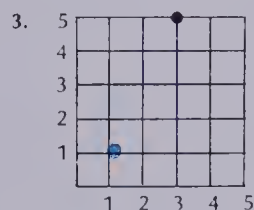
Draw the image after each slide.



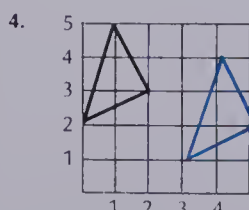
right 2, down 2



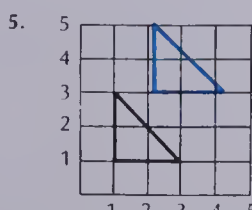
left 1, up 3



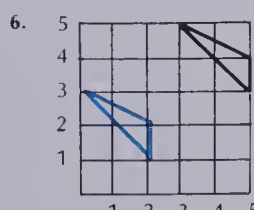
left 2, down 4



right 3, down 1



right 1, up 2



left 3, down 2

Worksheet G4

Pages 224-225

Objective G5

Identify and describe a flip of a plane figure over a line.

Introducing the Lesson

List the capital letters of the alphabet on the board. Place a mirror beside each letter and perpendicular to the board. (If *MIRAs* are available, students can print the letters on paper and do this activity themselves.) List the letters that are the same as their mirror images. (A, H, I, M, O, T, U, V, W, X, Y).

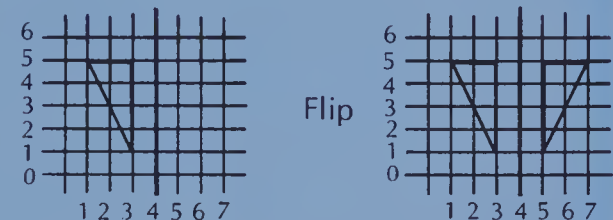
Place the mirror (or *MIRA*) at the top of each letter. List the letters that look like their mirror images. (B, C, D, E, H, I, K, O, X). Which letters are in both lists? (I, O, X).

Teaching the Lesson

Point out the illustration on page 226. Discuss how it shows a flip. Use tracing paper to print the letters of the alphabet. Flip the paper and hold it up to a light or window to show the flip image.

Repeat this with triangles and other polygons.

Use grid paper (or draw a grid on the board). Have students sketch the flip image as shown. Tell them that the line represents a mirror. We call it the **flip line**.



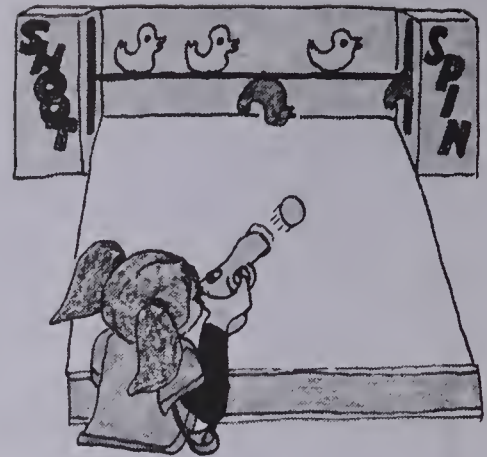
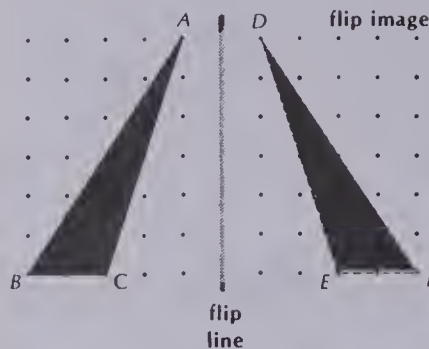
Ask students to name the flip image of each vertex.

Ask the students to match corresponding lines in the triangle and its image.

Discuss the example on page 226. Count the dots from the flip to each pair of matching vertices. Conclude that matching vertices are the same distance from the flip line.

Flips

We can flip a triangle over a line.

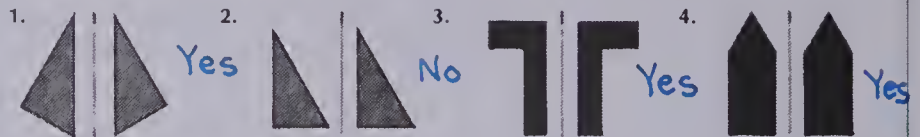


The second triangle is the **flip image** of the first. The image points are marked *D*, *E*, and *F*.

These points match: *A* and *D*, *B* and *F*, *C* and *E*.
These segments match: *AB* and *DF*, *AC* and *DE*, *BC* and *FE*.

EXERCISES

Does the diagram show a flip?

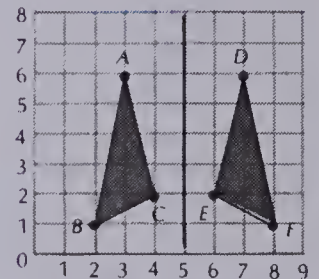


Write coordinates for each.

5. the flip image of point *A* (7,6)
6. the flip image of point *B* (8,1)
7. the flip image of point *C* (6,2)

Write another name for each.

8. the flip image of segment *BC* Segment *EF*
9. the flip image of segment *AC* *DE*



226

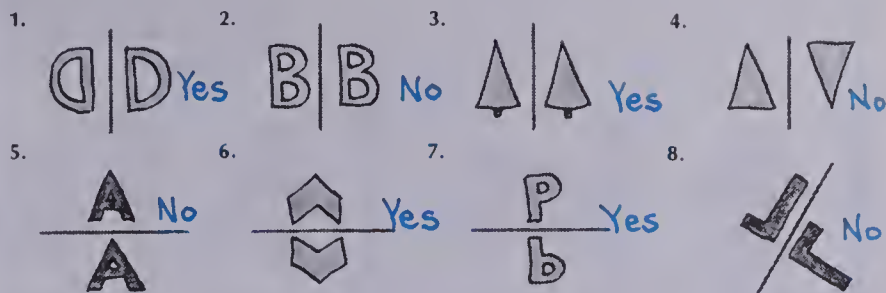
Using the Exercises

- If *MIRAs* are available, students may use them to test questions 1 to 4. If students answer question 2 incorrectly, use tracing paper to make a flip and demonstrate that the second triangle is not a flip image. (It is a slide image.)
- If students have any difficulty with questions 5 to 7, remind them to count left and right from the flip line.
- Have students check their answers to questions 8 and 9 by matching the points with their answers to questions 5 to 7.



PRACTICE

Are these flip images? Use tracing paper.

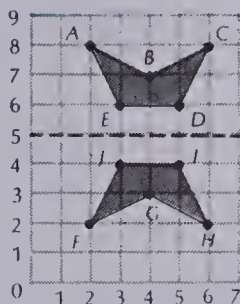


Write coordinates for each.

9. the flip image of point A (2,2)
10. the flip image of point B (4,3)
11. the flip image of point C (6,2)
12. the flip image of point D (5,4)
13. the flip image of point E (3,4)

Write another name for each.

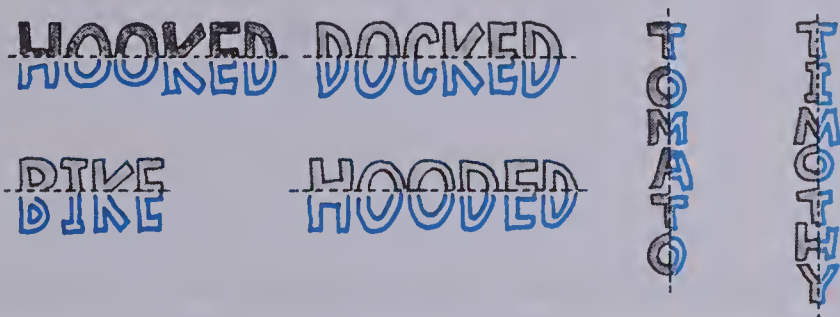
14. the flip image of segment BC GH
15. the flip image of segment ED JI
16. the flip image of figure ABCDE FGHIJ



Flipped Words

Half of these symmetric words are hidden.

What are the words?



227

Assigning the Practice

Minimum: 1-8
Average: 1-15
Enriched: 9-16

Reinforcement

1. Assign *Flipped Words* at the bottom of page 227. Students should guess the words, trace and flip them (or use a *MIRA*) to check their answers.

2. Have students draw polygons on dot paper. With each polygon, they draw a horizontal or vertical line and the flip image over that line. If *MIRAs* are available, the students may use them to check their work.

3. Have students look for examples of flips in designs and patterns. They may bring examples from wallpaper patterns, books, magazines, and newspapers to make a bulletin board display.

Enrichment

Have students write words in capital letters that look the same when flipped.

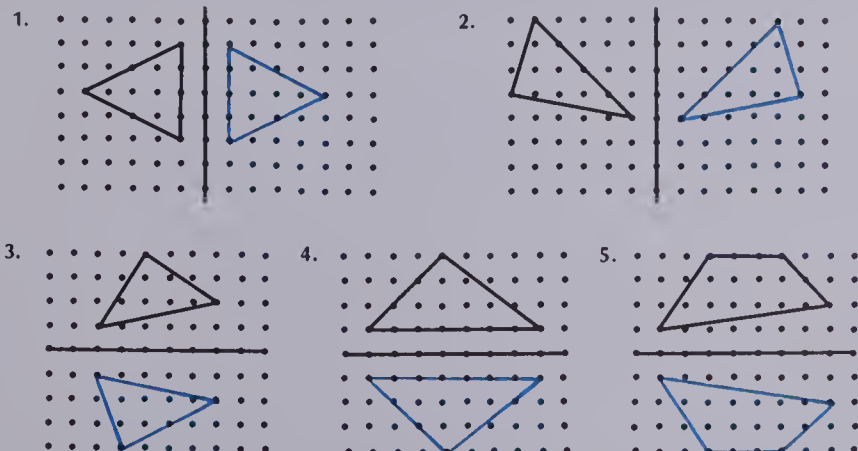
Examples: HOOK CHOICE

Extra Practice

Worksheet G5

Pages 226-227

Draw the flip image.

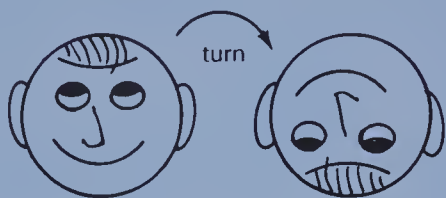


Objective G6

Identify and describe a quarter turn, a half turn, and a three-quarter turn image of a plane figure about a point.

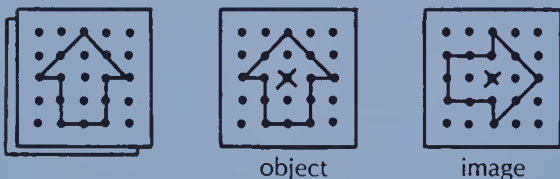
Introducing the Lesson

Sketch a happy face on a sheet of paper. Turn it halfway around. Discuss the half-turn image.



Teaching the Lesson

Give each student a geoboard and a sheet of dot paper. Ask the students to construct the following figure on their geoboards and to sketch the same figure on their dot paper. Ask them to write *object* under the sketch and to mark the centre dot — the *turning point*.



Have them place a finger on the turning point and turn the geoboard a quarter-turn clockwise. (Demonstrate this.) Then they sketch the figure on dot paper and label it *image*.

Repeat the above for a half-turn image and for a three-quarter-turn image.

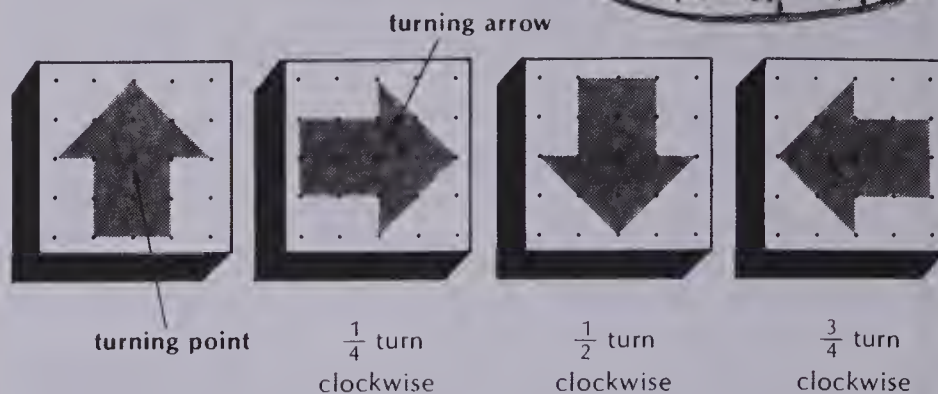
Refer to the textbook example and emphasize the importance of marking the turning point and the turn arrow. Show the difference between quarter turns that are clockwise and counter-clockwise.

You may want to mention and demonstrate that another dot could be used as the turning point. This results in more difficult problems.

Some students may notice that a quarter-turn clockwise and a three-quarter-turn counter-clockwise result in the same image.

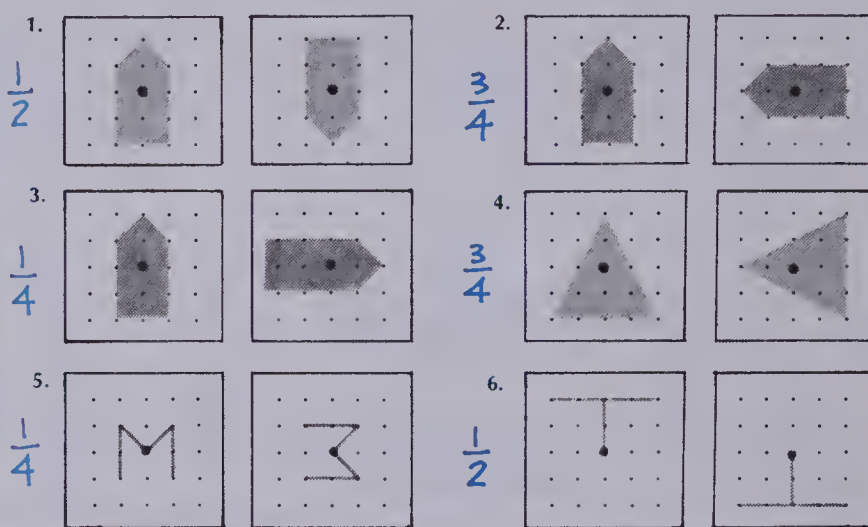
Turns

We can turn a figure around a point either clockwise or counter-clockwise.



EXERCISES

Write $\frac{1}{4}$ turn, $\frac{1}{2}$ turn, or $\frac{3}{4}$ turn. Each turn is clockwise. ↻

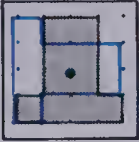
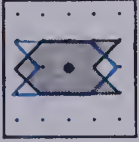
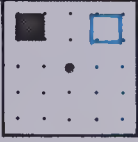

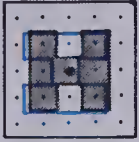

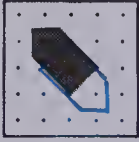
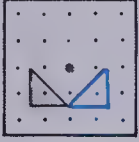



Using the Exercises

- If necessary, provide dot paper for students to copy the first figure in each question. Then they can make quarter, half, and three-quarter turns to compare with the second figure.

PRACTICE

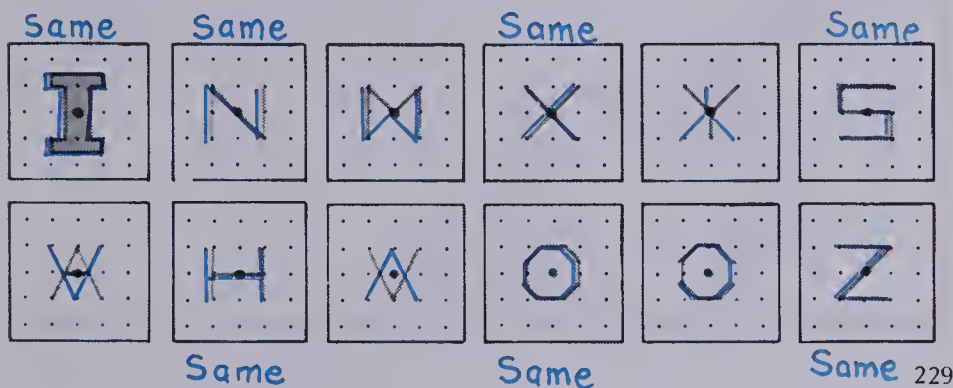
Draw the turn indicated.

- 
 $\frac{1}{4}$ turn clockwise
- 
 $\frac{1}{2}$ turn
- 
 $\frac{3}{4}$ turn counter-clockwise
- 
 $\frac{1}{2}$ turn
- 
 $\frac{1}{4}$ turn
- 
 $\frac{3}{4}$ turn
- 
 $\frac{1}{2}$ turn
- 
 $\frac{3}{4}$ turn clockwise
- 
 $\frac{1}{4}$ turn clockwise

Turning Letters

Show the letters after a $\frac{1}{2}$ turn.

Which look the same?



Assigning the Practice

Minimum: 1-9

Average: 1-9

Enriched: 1-9

Reinforcement

1. Assign *Turning Letters* on page 229. Provide dot paper.

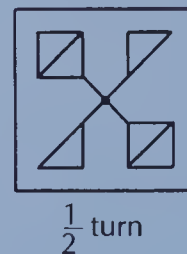
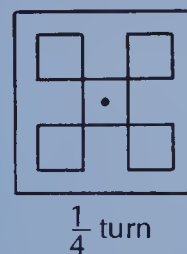
2. Which numerals (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) look the same after a half turn? What do you notice about 6 and 9?

3. Have students add to the bulletin board display examples of turns used in designs and patterns.

Enrichment

Ask students to construct figures on a geoboard or dot paper that are the same after a quarter turn or a half turn. Challenge them to make the figures as complicated as possible.

Examples:

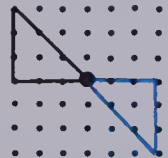
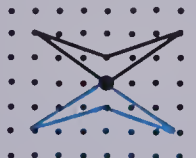
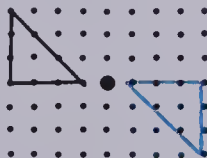


Extra Practice


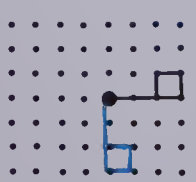
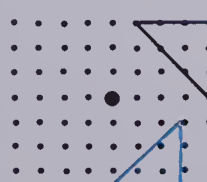
Worksheet G6

Pages 228-229

Draw the image after a $\frac{1}{2}$ turn clockwise.

- 
- 
- 

Draw the image after a $\frac{1}{4}$ turn clockwise

- 
- 
- 

Objective G7

Identify plane figures that have the same shape and the same size (congruent figures).

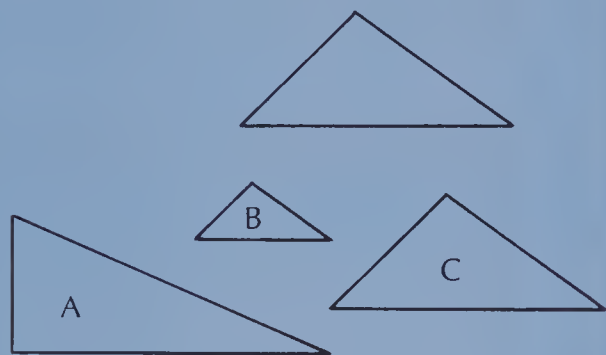
Introducing the Lesson

Challenge students to find two objects or figures in the classroom that have the same shape but not the same size. Find two objects (such as window panes) that have the same shape *and* size. Ask, "What is the advantage, when constructing a building, of having all the windows the same size and shape?"

Teaching the Lesson

Define *congruent* as having the same size and shape. (Explain that line segments and angles are said to be congruent if they are the same size. "Shape" is an attribute of more complicated figures.)

Sketch 4 triangles on the board like this.



Ask, "Which triangle is congruent to the first one?" Triangle A is a different shape. Triangle B is the same shape, but a different size. Triangle C is the same shape *and* size as the first triangle.

Have students work in pairs. One student draws a triangle. The other must draw another triangle congruent to the first one. Students may experiment and check their triangles by measuring the sides.

Students should discover that the most accurate method for their doing this is to trace the first triangle. Alternatively, carbon paper may be used to make a congruent triangle.

Make three tracings of a triangle. Slide one, flip another, and turn another to demonstrate that congruent triangles are images of each other even after these motions (or combinations of these motions) have taken place.

Congruence

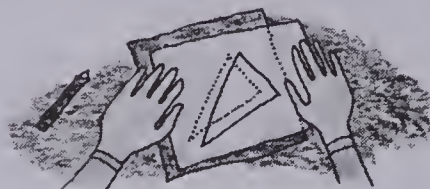
Figures that have the same size and shape are **congruent**.



congruent angles



congruent triangles



The slide, flip and turn images of a figure are congruent.

EXERCISES

Are the figures congruent? Trace the first and compare.

1. No
2. Yes
3. Yes
4. Yes
5. Yes
6. No

230

Using the Exercises

- Remind students that their tracings may have to be flipped in order to make the comparisons.

PRACTICE

Are the figures congruent?

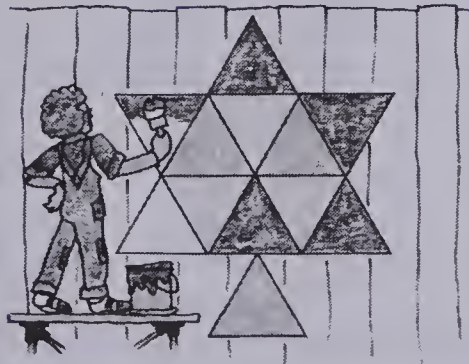
1. Yes
2. No
3. Yes
4. Yes
5. No
6. Yes
7. Yes
8. Yes
9. No
10. Yes
11. No
12. Yes

Triangle Challenge

How many triangles are there in this figure? How many are congruent to each of these triangles?

- a. 12
- b. 5

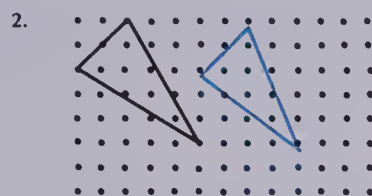
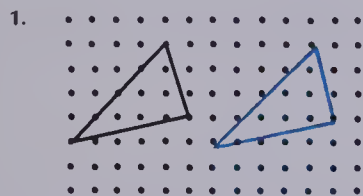
18



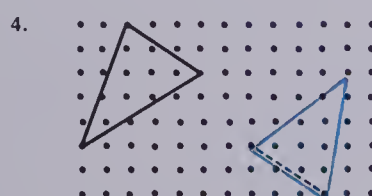
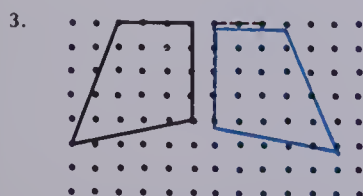
231

Extra Practice

Draw a congruent figure.



Complete a congruent figure.



Worksheet G7

Pages 230-231

Assigning the Practice

Minimum: 1-6
Average: 1-12
Enriched: 1-12

Reinforcement

1. Assign *Triangle Challenge* on page 231. Students should notice that there are three sizes of triangles in the figures. There is one big one not given as an example in a or b.

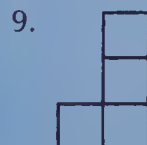
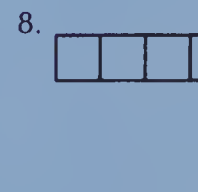
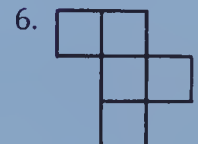
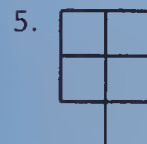
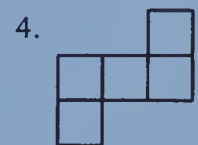
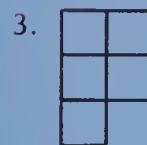
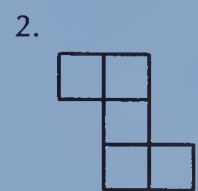
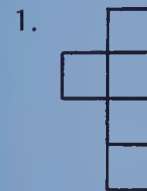
2. How many triangles are there in each star?



3. Have students work in pairs with geo-boards or dot paper. One student draws a polygon. The other must draw a polygon congruent to the first one.

Enrichment

Find 3 pairs of congruent figures.

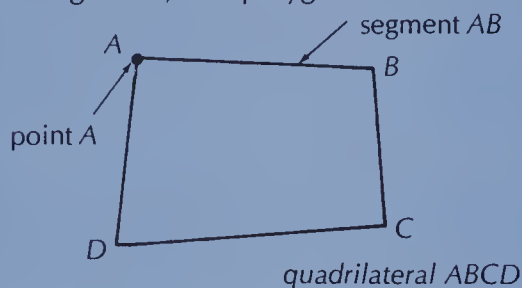


Objective G8

Name corresponding sides and corresponding vertices of congruent polygons.

Introducing the Lesson

Review the conventions for labelling points, line segments, and polygons.



Note that polygons are named by going from point to point in one direction, either clockwise or counter-clockwise.

Teaching the Lesson

Open the textbook to page 232. The students should trace triangle ABC and label the vertices. Then they fit the tracing of triangle ABC over triangle DEF. Note the points and sides that match. Have them measure the matching sides. AC is 5 cm long. DF is also 5 cm long. Have the students work in pairs and draw congruent polygons. Note that matching sides of congruent polygons are always the same length.

Matching Parts of Congruent Figures

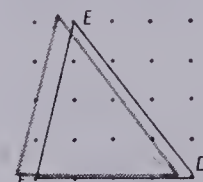


These two triangles are congruent.

These vertices and sides match.

A and D, B and E, C and F
AB and DE, BC and EF, AC and DF

Matching sides are the same length.



EXERCISES

Name the vertices and sides that match.

1.

A and D
B and E
C and F
AB and DE
BC and EF
AC and DF

2.

A and D
B and E
C and F
AB and DE
BC and EF
AC and DF

3.

A and D
B and E
C and F
AB and DE
BC and EF
AC and DF

4.

P and S
Q and T
R and U
PQ and ST
QR and TU
PR and US

232

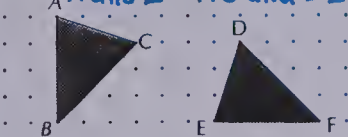
Using the Exercises

- The students may use tracings, if necessary, in order to match up the pairs. But first they should try the exercises without tracing. They can also check their answers by measuring the matching sides. Remind them that tracings may have to be flipped in order to match.

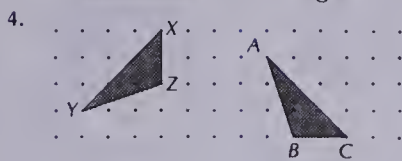
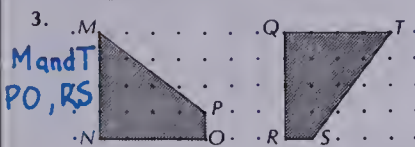
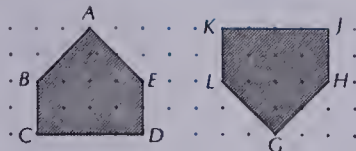
PRACTICE

Name one pair of matching vertices and one pair of matching sides.

1. **A and E** **AC and DE**



A and G
BC and JH



5. Draw a triangle. Mark the vertices A, B, and C. Draw another triangle congruent to the first one. Slide the new triangle. Turn it. Mark the new vertices D, E, and F so that D matches A, E matches B, and F matches C.

REVIEW

Does the diagram suggest a flip?

- G5 1. **P | P** **No** 2. **Q | Q** **Yes** 3. **F | F** **No**

Write $\frac{1}{4}$ turn, $\frac{1}{2}$ turn, or $\frac{3}{4}$ turn.

- G6 4. **X** $\frac{1}{4}$ 5. **A** $\frac{3}{4}$ 6. **T** $\frac{1}{2}$

Is the figure congruent to the first one?

- G7 7. **Yes** 8. **No** 9. **Yes**

233

Assigning the Practice

Minimum: 1-4

Average: 1-5

Enriched: 1-5

Review Exercises

Questions	Objective	Pages
1-3	G5	226-227
4-6	G6	228-229
7-9	G7	230-231

Reinforcement

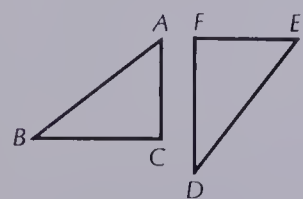
Have students draw polygons on dot paper. On each polygon have them draw the image after a slide, turn, and flip. Then they label the vertices of the images and record the matching vertices and sides.

Enrichment

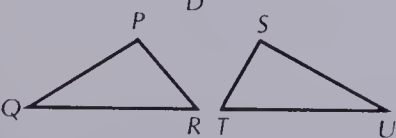
Have the students investigate the congruence of regular polygons — equilateral triangles, squares, regular pentagons, and so on. They will find that particular points don't match in a unique way. In fact, a tracing of an N-sided regular polygon will fit on a congruent polygon in N different ways.

Extra Practice

For each pair of congruent triangles, name the matching parts.



1. A and **E**
2. B and **D**
3. C and **F**
4. AB and **DE**
5. BC and **DF**
6. AC and **EF**



7. P and **S**
8. **R** and T
9. **Q** and U
10. PQ and **SU**
11. **PR** and ST
12. **QR** and TU

Worksheet G8

Pages 232-233

Objective G9

Identify and construct tiling patterns (tessellations).

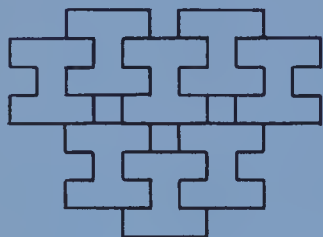
Introducing the Lesson

Discuss patterns and ask students for examples of tiling patterns: floor tiles, ceiling tiles, bathroom tiles, bricks, building blocks, wallpaper patterns. Discuss how *congruent* tiles or blocks fit together and form designs.

Teaching the Lesson

Discuss the illustrations at the top of page 234. Stress the two important aspects of tiling patterns — that the pieces fit together leaving no uncovered spaces and that the pieces do not overlap.

Place block Hs on an overhead projector.



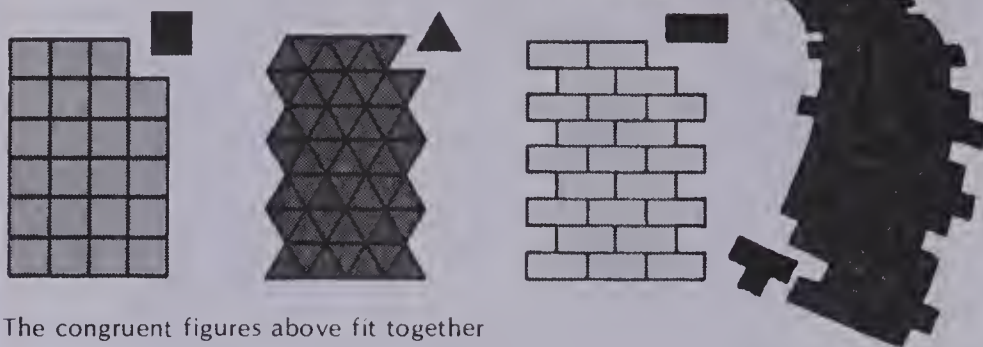
Ask students to test other block letters on the overhead to see if they will tile the surface.



Demonstrate other tiling patterns with squares, triangles, and rectangles. Also use some odd shapes that will *not* tile a surface in a regular pattern.

Tiling Patterns

Tiling patterns completely cover a surface



The congruent figures above fit together to **tile** a flat surface.

EXERCISES

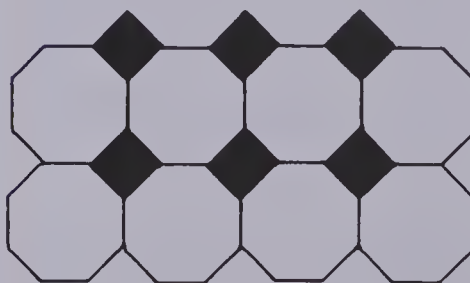
Trace these figures to test if sets of each one will tile a flat surface.

- Yes
- Yes
- No
- Yes
- No
- Yes
- Yes
- Yes
- No

234

Using the Exercises

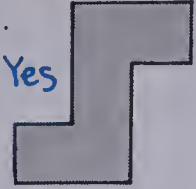
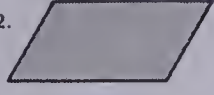

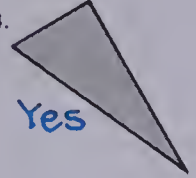
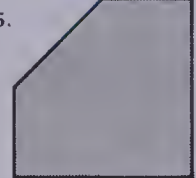
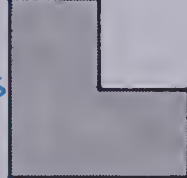
- Give students plenty of time to experiment with these before working through the answers with them. Remind them that their tiling patterns should not have spaces. They may note that question 5 makes a regular pattern leaving square spaces.



Sometimes floor tiles (and others) use two (or more) types of congruent tiles to make a pattern.



PRACTICE

Which figures will tile a flat surface?

1.  Yes
2.  Yes
3.  Yes
4.  Yes
5.  Yes
6.  Yes

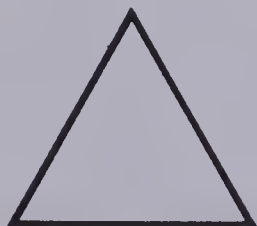
Follow the pattern.

How many tiles are needed for the next figure?

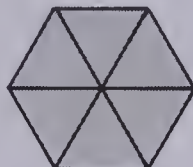
7.  ? 15
8.  ? 25

Polygons

Make six different polygons from cutouts of this triangle.



Example:



hexagon

235

Assigning the Practice

Minimum: 1-6

Average: 1-8

Enriched: 1-8

Reinforcement

1. Assign *Polygons* at the bottom of page 235.

2. Ask students to create their own tiling patterns. They can cut them out and other students can piece them together again.

3. Parquetry blocks, felt polygons, or other commercial materials might be made available for students to piece together and create tiling patterns.

4. Ask the students to show how a quadrilateral can be made from a right-angled triangle.

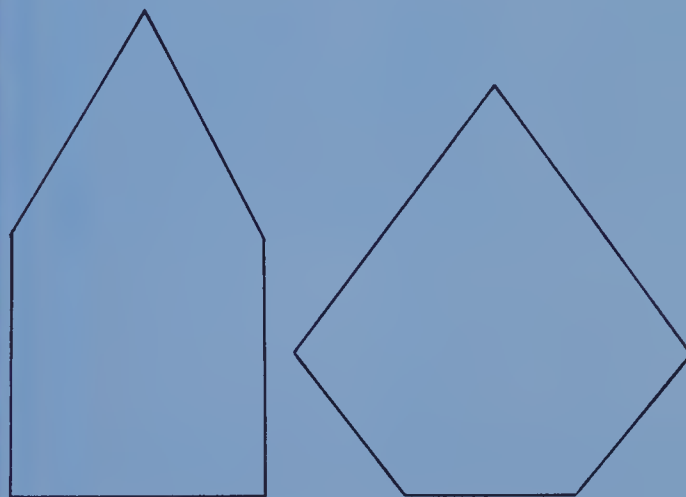


Have them construct the following figures from a right-angled triangle.

- a. square
- b. hexagon
- c. triangle with 3 equal sides

Enrichment

1. Have the students make a tiling pattern with each of the following polygons.



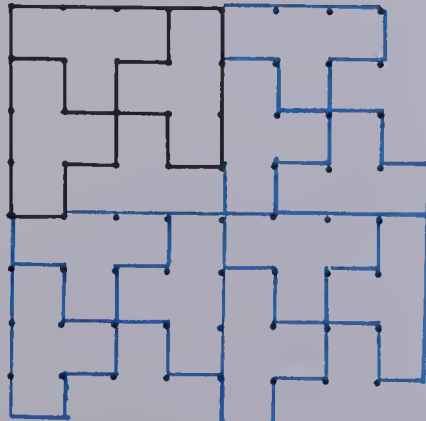
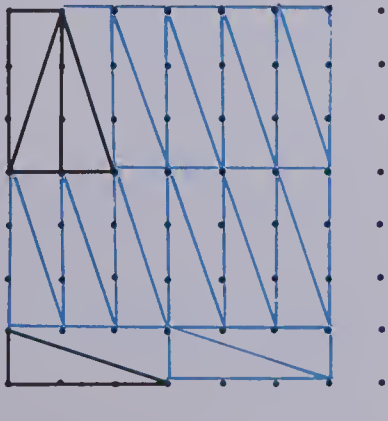
2. Provide the students with *Pentominoes*.

Extra Practice

Worksheet G9

Pages 234-235

Continue each pattern to fill the grid.

1. 
2. 

Objective PS9

Solve problems involving diagrams.

Introducing the Lesson

Discuss the proverb "A picture is worth a thousand words". Ask what it means. Point out that it is easier to understand many problems if a picture is shown with the description. Play a game in which the students try to identify geometric figures and solids from verbal descriptions. For example, "What kind of path do you make when you walk straight for 5 m, turn right and walk 8 m, turn right and walk 5 m, and then go back to where you started?" Draw a diagram of the walk to show the answer: a rectangle. Do several similar examples.

Teaching the Lesson

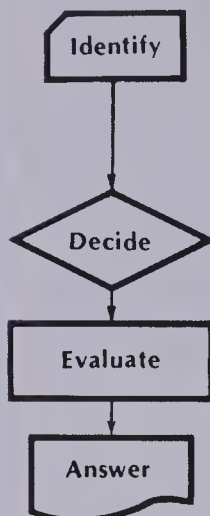
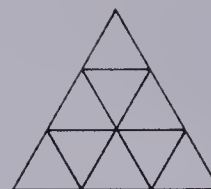
Work through the example on page 236. Draw the diagram on the board before opening the textbook. Ask the students how many triangles there are in the figure. They will most likely say 9, counting only the smallest triangles. Now open the textbook and point out the 1 big triangle and 3 medium triangles.

Point out that the first, simple answer is not always the complete answer to a problem. We must check to make sure we have accounted for *all* of the facts.

Point out that it is often helpful to redo a diagram that is given with a problem. This is what we did with the triangle problem to show the 3 medium-sized triangles in different colours — blue, red, and black.

Using Diagrams

How many triangles are there in the figure?



There are three sizes of triangles in the figure.
a large one medium ones small ones

Count each type and add.
1 big triangle
3 medium triangles
9 small triangles



$$1 + 3 + 9 = 13$$

There are 13 triangles in the figure.

EXERCISES

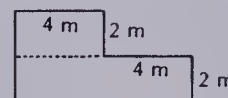
Use the diagrams to solve the problems.

1. How many rectangles?



18

2. What is the area?



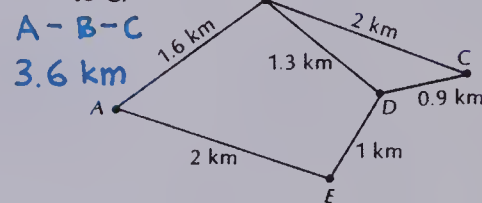
24 m²

3. How many couples?



8

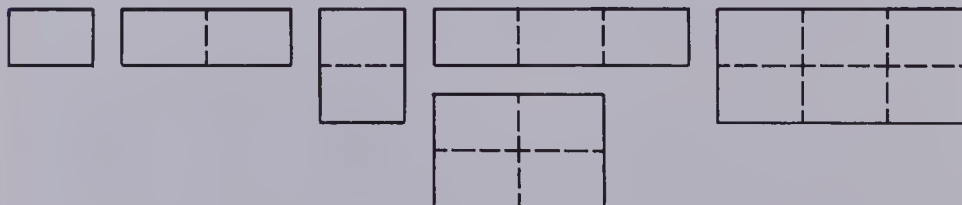
4. Find the shortest route from A to C.



A-B-C
3.6 km

Using the Exercises

- Question 1 is similar to the triangle problem. There are 6 sizes of rectangles.



- Question 2 is a three-step problem. Find the length of the longer rectangle (8 m). Find the area of each rectangle. Add the areas.
- In question 3, explain that drawing lines and counting them makes this problem easy to do. If students don't understand the process, do the problem with fewer people and make a list of all the couples. Show how the diagram is a simple way of showing the list.
- Question 4 is a guess and test problem. Students must determine all the routes to check that their guesses are correct.

PRACTICE

Solve each of the following problems. If a diagram does not accompany the problem, draw one before solving it. Be sure that your diagram is labelled with all the facts.

1. How many different rectangles can you find in this diagram?

16

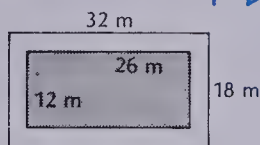


2. One Sunday afternoon, Sally left her house and went on a walk that took her 6 blocks North, 5 blocks East, 3 blocks South, 4 blocks West, and 3 blocks South. How far was she from home at the end of the walk, and in which direction?

1 block East

3. Trudy and Ted have cut the portion of the lawn that is shaded in the diagram. What is the area of the part they still have to cut?

264 m²

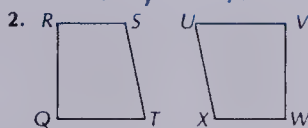
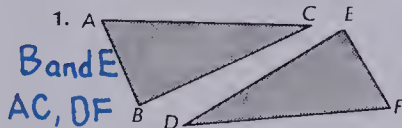


REVIEW

Name one pair of matching vertices and one pair of matching sides.

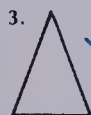
S and X, RS, XW

G8

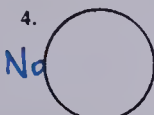


Will the figure tile a surface?

G9



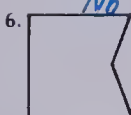
Yes



No



Yes



No

237

Assigning the Practice

Minimum: 1-3

Average: 1-3

Enriched: 1-3

Review Exercises

Questions	Objective	Pages
1-2	G8	232-233
3-6	G9	234-235

Reinforcement

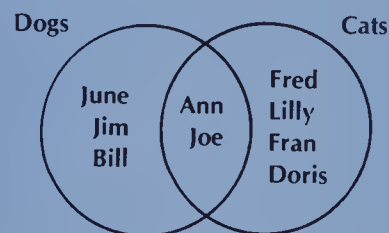
1. Have students draw pictures while other students make up problems based on the pictures.

2. Ask students to make up their own problems that require drawing a diagram.

Enrichment

Introduce Venn diagrams.

Example: The diagram shows students who have dogs and cats as pets.



1. Which students have dogs as pets? (June, Jim, Bill, Ann, Joe)

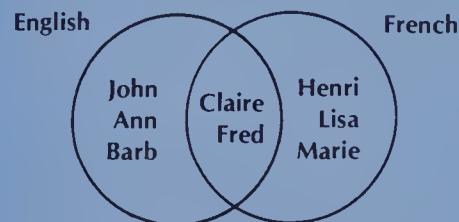
2. Which students have only dogs as pets? (June, Jim, Bill)

3. Which students have cats? (Fred, Lilly, Fran, Doris, Ann, Joe)

4. Which students have only cats? (Fred, Lilly, Fran, Doris)

5. Which students have *both* cats and dogs? (Ann and Joe)

Similar problems may be assigned based on diagrams like this.



Problem Solving Activities

Assign Level 5, Unit 10.

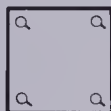
Extra Practice

Worksheet PS9

Pages 236-237

1. Pictures are put up with a tack in each corner. What is the smallest number of tacks that can be used to put up 9 pictures so that they can all be seen?

16



2. How many angles are formed by 5 rays with the same endpoint?

10

3. A lakefront lot is rectangular and fenced on 3 sides. There are 60 m of lake frontage. 140 m of fencing was used. What is the area of the lot?

2400 m²

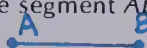
Unit 10 Objective	Test Questions	Pages
G1	1-5	218-219
G2	6-9	220-221
G3	10-11	222-223
G4, G5, G6	12-15	224-229
G7	16-18	230-231
G8	19-21	232-233

TEST

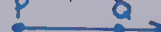
UNIT 10

Draw each.

1. line segment AB



2. ray PQ



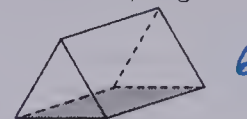
3. line XY



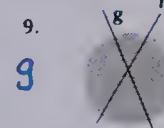
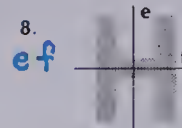
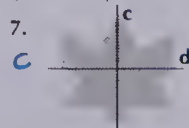
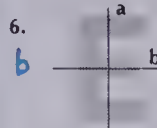
4. How many vertices?



5. How many edges?



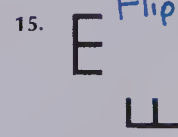
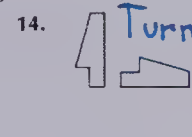
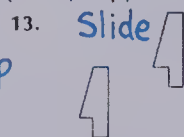
Which are lines of symmetry?



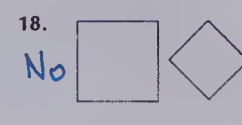
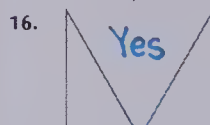
10. What figure has 5 sides and 5 vertices? **A pentagon**

11. What figure has 4 congruent sides, 4 vertices, and 4 square corners? **A square**

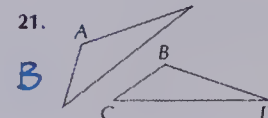
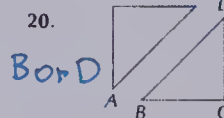
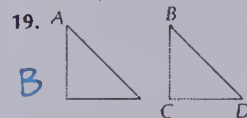
Name the motion (slide, flip, or turn).



Are these pairs of figures congruent?



Which point matches A?

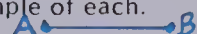


Post-test

Unit 10

Draw an example of each.

1. line segment AB



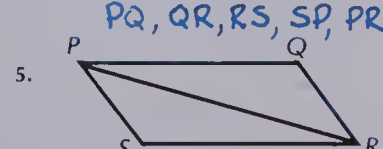
2. ray PQ



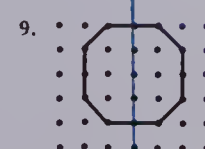
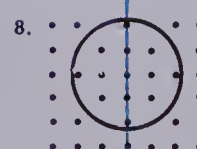
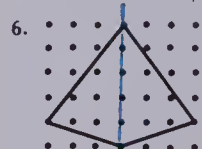
3. vertex A of a triangle



Name all the segments in each figure.



Draw a line of symmetry.



10. Draw a pentagon.



11. Draw a hexagon.



MULTIPLICATION

Multiply.

- | | | | | |
|-------------------------------------|--|--------------------------------------|--|--------------------------------------|
| 1. 0.03×3
<u>0.09</u> | 2. 0.06×24
<u>1.44</u> | 3. 0.42×5
<u>2.10</u> | 4. 0.48×37
<u>17.76</u> | 5. 0.74×6
<u>4.44</u> |
| 6. 1.04×2
<u>2.08</u> | 7. 2.34×31
<u>72.54</u> | 8. 5.67×6
<u>34.02</u> | 9. 4.92×49
<u>241.08</u> | 10. 6.75×7
<u>47.25</u> |
| 11. 5×0.6
<u>3.0</u> | 12. 13×0.9
<u>11.7</u> | 13. 48×0.2
<u>9.6</u> | 14. 137×0.5
<u>68.5</u> | 15. 258×0.3
<u>77.4</u> |
| 16. 0.1×0.2
<u>0.02</u> | 17. 0.3×0.4
<u>0.12</u> | 18. 0.4×0.6
<u>0.24</u> | 19. 0.5×0.8
<u>0.40</u> | 20. 0.7×0.5
<u>0.35</u> |
| 21. 2.3×0.3
<u>0.69</u> | 22. 13.3×0.4
<u>5.32</u> | 23. 4.5×0.5
<u>2.25</u> | 24. 37.6×0.6
<u>22.56</u> | 25. 7.8×0.7
<u>5.46</u> |
| 26. 4.2×2.1
<u>8.82</u> | 27. 31.5×4.3
<u>135.45</u> | 28. 3.8×5.4
<u>20.52</u> | 29. 94.2×6.7
<u>631.14</u> | 30. 6.3×7.1
<u>44.73</u> |
- Divide. 0.8 0.23 0.96 28.9 5.36
31. $2 \overline{)1.6}$ 32. $4 \overline{)0.92}$ 33. $5 \overline{)4.80}$ 34. $3 \overline{)86.7}$ 35. $6 \overline{)32.16}$

Use division to express each fraction in decimal form.

36. $\frac{1}{2}$ 0.5 37. $\frac{1}{4}$ 0.25 38. $\frac{3}{5}$ 0.6 39. $\frac{3}{4}$ 0.75 40. $\frac{7}{10}$ 0.7

Solve.

41. 4 tenths of the students have pets.
3 tenths of the pets are dogs.
What part of all the students have dogs? 0.12
42. A board 3.6 m long is to be cut into
6 equal parts. How long will each part be? 0.6 m

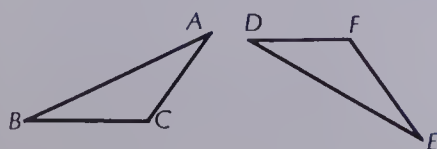
239

Draw the image.

12. 13. 14. 15.
- Slide: right 3, up 1 flip line $\frac{3}{4}$ turn Slide left 2, down 1

Draw a congruent figure.

16. 17. 18.



Name the matching part.

19. A and E 20. F and C
21. BC and DF

UNIT 11

Decimals and Ratios

Theme: Towers

Lesson		Objective	Pages
Preview		Review decimals to hundredths.	241
1	N19	Extend the numeration system to thousandths.	242–243
2	N20	Regroup tenths, hundredths, and thousandths.	244–245
3	A44	Add and subtract thousandths.	246–247
4	A45	Multiply thousandths by a whole number.	248–249
5	A46	Recognize, write, and use rates.	250–251
6	A47	Use rates to find and compare prices.	252–253
7	A48	Use rates to find speed.	254–255
8	N21	Understand the meaning of percent.	256–257
9	A49	Find the percent of a number.	258–259
10	PS10	Solve two-step problems.	260–261
Test		Decimals and ratios	262
Review		Geometry	263

About This Unit

Several new concepts are introduced to the students in this unit. Lesson 1 introduces thousandths in a concrete way and explains its relationship to other places in our base 10 place-value system. Lessons 3 and 4 use thousandths in addition, subtraction, and multiplication calculations. Rounding and estimating skills are again emphasized in these lessons.

Lessons 5, 6, and 7 introduce rates, speed, and price rates. Students become acquainted with such terms as *unit rate*, *per*, *distance*, *speed*, and *time*. Equivalent fractions are used to determine costs of several items, distance, time, and the unit rate or speed.

3 bars of soap cost \$1.79.

What will 9 bars cost?

$$\frac{\text{amount}}{\text{cost}} = \frac{3}{1.79} = \frac{3 \times 3}{1.79 \times 3} = \frac{9}{5.37}$$

9 bars cost \$5.37.

A car drives at a speed of 85 km/h.

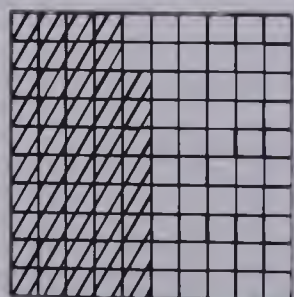
How long will it take to go 170 km?

$$\frac{\text{distance}}{\text{time}} = \frac{85 \text{ km}}{1 \text{ h}} = \frac{85 \times 2}{1 \times 2} = \frac{170}{2}$$

It will take 2 h.

An important prerequisite skill for these lessons is an understanding of equivalent fractions which were introduced in Unit 7, Fractions and Ratios.

Lessons 8 and 9 introduce the meaning of percent and finding the percent of a number. Students are given a concrete, visual model of the meaning of percent and it is related to fractions and decimals. Then students do simple computations with percent as they solve realistic problems involving sales tax, discount, interest, and test scores.



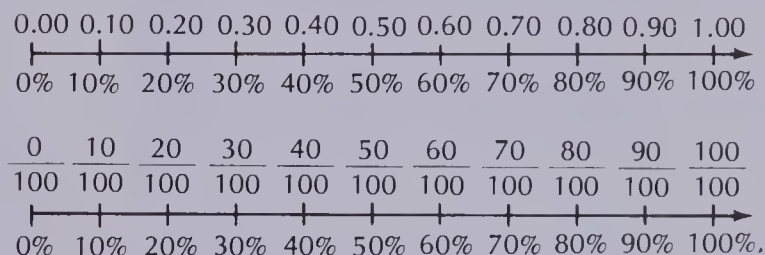
$$\frac{48}{100} = 0.48 = 48\%$$

All lessons in this unit deal with real-life problem-solving situations. Lesson 10, however, concentrates on providing the student with specific guidelines for solving two-step problems.

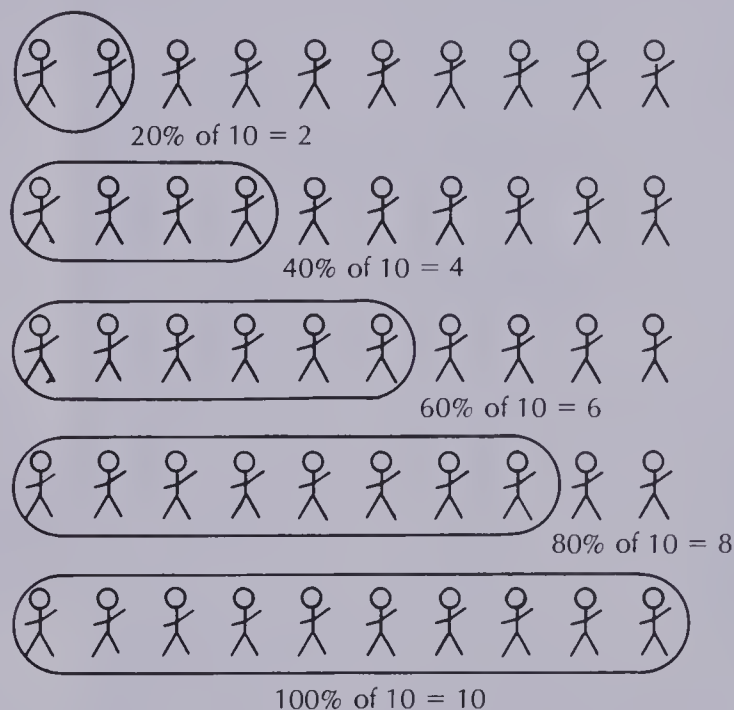
Ideas

The following models can be used to provide an easy-to-understand, visual representation of percent patterns.

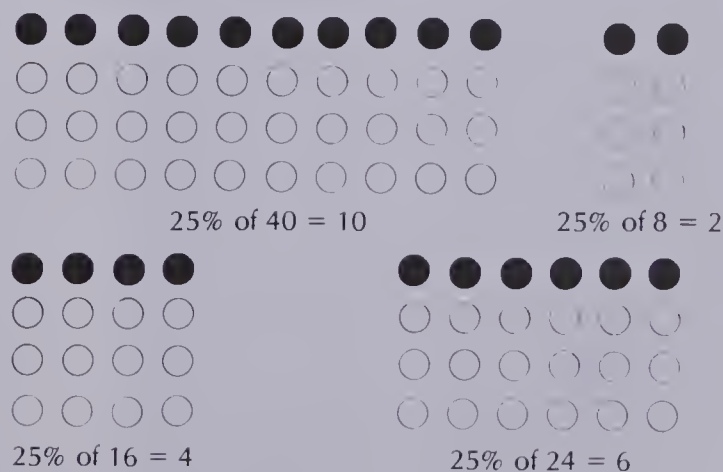
1.



2.



3.



UNIT 11

DECIMALS & RATIOS



Unit 11 Objective	Test Questions	Pages
N19	1-10	242-243
N20	11-13	244-245
A44	14-17	246-247
A45	18-21	248-249
A46	22	250-251
A47	23	252-253
A48	24	254-255
N21	25-34	256-257
A49	35-37	258-259

Pretest

Unit 11

Write as a decimal.

1. $\frac{42}{1000}$ **0.042** 2. $\frac{945}{1000}$ **0.945** 3. $\frac{8}{1000}$ **0.008** 4. $\frac{19}{1000}$ **0.019** 5. $\frac{6738}{1000}$ **6.738**

Round each decimal to the nearest hundredth.

6. 0.274 **0.27** 7. 0.481 **0.48** 8. $\frac{26.488}{26.49}$ 9. $\frac{264.906}{264.91}$ 10. $\frac{9.645}{9.65}$

Write as a decimal.

11. 4 tenths + 8 hundredths + 11 thousandths **0.491**

12. 1 ten + 14 ones + 16 tenths + 4 hundredths **25.64**

13. 8 ones + 2 tenths + 19 hundredths + 32 thousandths **8.422**


Compute.

14. $\begin{array}{r} 38.16 \\ + 9.778 \\ \hline 28.382 \end{array}$

15. $\begin{array}{r} 25.664 \\ + 98.75 \\ \hline 124.414 \end{array}$

16. $\begin{array}{r} 4.726 \\ - 1.89 \\ \hline 2.836 \end{array}$





17. $\begin{array}{r} 3.2 \\ - 2.195 \\ \hline 1.005 \end{array}$



Tower Restaurant

Menu	
Sandwiches	
Ham	\$2.50
Tomato	\$2.00
Cheese	\$1.50
Salads	
Salad	\$2.25
Soup	\$1.75
Beverages	
Milk	\$0.65
Orange Juice	\$0.95
Tomato Juice	\$0.75
Hot Dogs & Burgers	
Hot Dog	\$1.80
Hamburger	\$3.75
Omelette & Quiche	
Omelette	\$2.35
Quiche	\$3.50
Dessert	
Ice Cream	\$1.35
Cake	\$1.55
Pie	\$1.45
Fruit Salad	\$1.25

What is the total amount of each check?

1.	2.	3.	4.
<div style="text-align: center;">Check </div> 1 Ham Sandwich 1 Salad 1 Milk	<div style="text-align: center;">Check </div> 2 Soups 2 Salads 2 Milks	<div style="text-align: center;">Check </div> 3 Salads 2 Milks 1 Tomato Juice 3 Ice Creams	<div style="text-align: center;">Check </div> 1 Omelette 2 Hamburgers 3 Tomato Juices 1 Pie
\$5.40	\$9.30	\$12.85	\$13.55 ²⁴¹

Suggestions

Use the illustration on page 240 to begin a discussion about Toronto's CN Tower. Point out that it is the tallest free-standing structure in the world (553 m). Construction on the building began in 1973 and was completed in 1976.

Ask if anyone in the class has visited the 400 seat CN Tower Restaurant which revolves in the Sky Pod at 347.5 m. From there, visibility can extend for 120 km.

About the Page

Point out the menu on page 241. Use the prices given to review base ten addition, subtraction, multiplication, and rounding skills. Ask these and other similar questions.

a. Addition

"What is the total cost of 1 salad, 1 omelette, 1 serving of pie, and 1 glass of milk?"

b. Subtraction

"How much more do a piece of cake and milk cost than a fruit salad and tomato juice?"

c. Multiplication

"What is the cost of 5 hamburgers?"

d. Rounding

"Round the cost of 1 ham sandwich and 1 tomato juice to the nearest dime."

Reinforcement

Obtain a pad of blank order forms and a menu from a local fast food restaurant. Have the students fill out orders and then exchange them to calculate the total cost of the order. Ask the students *estimating* and *rounding* questions, e.g., "Would \$5.00 be enough to pay for Mary's order? Approximately how much change would Jerry receive after he paid for his order with a \$20 bill?"


- | | | | |
|---|--|--|--|
| 18. $\begin{array}{r} 0.472 \\ \times 8 \\ \hline 3.776 \end{array}$ | 19. $\begin{array}{r} 0.084 \\ \times 7 \\ \hline 0.588 \end{array}$ | 20. $\begin{array}{r} 6.509 \\ \times 15 \\ \hline 97.635 \end{array}$ | 21. $\begin{array}{r} 4.326 \\ \times 21 \\ \hline 90.846 \end{array}$ |
| Solve. | | | |
| 22. 8 people per team. <u>48</u>
How many people for 6 teams? | 23. 2 boxes cost \$1.45. <u>\$5.80</u>
What do 8 boxes cost? | | |
| 24. A car travels at 90 km/h.
How far will it go in 3 h? <u>270 km</u> | | | |
| Write as a percent. | | | |
| 25. 0.15 <u>15%</u> | 26. 0.95 <u>95%</u> | 27. 0.02 <u>2%</u> | 28. 1.00 <u>100%</u> |
| 29. 1.55 <u>155%</u> | Write each percent as a fraction with a denominator of 100. | | |
| 30. 2% <u>$\frac{2}{100}$</u> | 31. 48% <u>$\frac{48}{100}$</u> | 32. 100% <u>$\frac{100}{100}$</u> | 33. 85% <u>$\frac{85}{100}$</u> |
| 34. 112% <u>$\frac{112}{100}$</u> | Solve. | | |
| 35. 25% of 72 = <u>18</u> | 36. 40% of 75 = <u>30</u> | 37. 30% of 400 = <u>120</u> | |

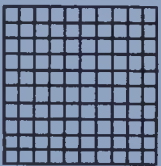
Objective N19

Extend the numeration system to thousandths.

Introducing the Lesson

Display a cubic decimetre. Review its dimensions (page 108). Ask, "How many centimetre cubes fit in a cubic decimetre?" Discuss how many centimetre cubes are in one layer and then in all ten layers. 1000 cm^3 in all.

How many rods are there in the cubic decimetre?  100 rods.

How many flats are there in the cubic decimetre?  10 flats.

Teaching the Lesson

Show the size of one flat in relation to a cubic decimetre.

1 out of 10 flats

$\frac{1}{10}$ or 0.1 of a cubic decimetre

Show the size of one rod in relation to a cubic decimetre.

1 out of 100 rods

$\frac{1}{100}$ or 0.01 of a cubic decimetre

Let the students determine the size of 1 cm^3 in relation to 1 dm^3 .

1 out of 1000 cubes

$\frac{1}{1000}$ or 0.001 of a cubic decimetre

Have the students write the fraction and the decimal for the following subsets of a cubic decimetre.

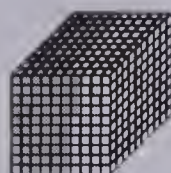
4 cm^3 9 cm^3 25 cm^3 89 cm^3
147 cm^3 238 cm^3 1000 cm^3 1500 cm^3

Show a metre stick. "How many millimetres are in 1 m? What part of a metre is 1 mm? 5 mm? 45 mm? 672 mm?"

Read and discuss the top of page 242. Recall the rules for rounding decimals from page 20. Ask individual students to round the following to the nearest hundredth and explain each step of the procedure to the rest of the class.

0.347 62.594 9.485 6.735

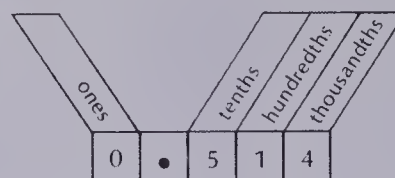
Thousandths



0.514

Each small cube is $\frac{1}{1000}$ of the large cube.

One thousandth may be written as 0.001



$$\frac{514}{1000} = 0.514$$

five hundred fourteen thousandths

To round to the nearest hundredth, check the thousandths digit.

4 or less rounds down: 0.514 \rightarrow 0.51

5 or more rounds up: 0.515 \rightarrow 0.52

EXIT SLIP

Write the decimal.

1. one hundred twenty-three thousandths **0.123**
2. six hundred nine thousandths **0.609**
3. fifteen thousandths **0.015**
4. three thousandths **0.003**
5. eight **and** eighty-five thousandths **8085**
6. $\frac{293}{1000}$ **0.293**
7. $\frac{34}{1000}$ **0.034**
8. $\frac{9}{1000}$ **0.009**
9. $\frac{1018}{1000}$ **1.018**

Compare using < or > .

10. 0.832 \bullet 0.823 \angle
11. 0.402 \bullet 0.42 \angle
12. 0.035 \bullet 0.305 \angle
13. 4.049 \bullet 4.062 \angle
14. 15.608 \bullet 15.68 \angle
15. 4.892 \bullet 3.893 \gt

Round to the nearest hundredth.

16. 0.491 **0.49**
17. 6.375 **6.38**
18. 7.497 **7.50**
19. 8.996 **9.00**

Using the Exercises

- Questions 1 to 5 require the students to write a decimal in thousandths from words. Note the bold face "and" in question 5 which reminds the students where the decimal point is placed.
- Questions 6 to 9 require the students to write a decimal from a fraction in thousandths. Students should see that all decimals in thousandths have three decimal places.
- Questions 10 to 15 involve comparing decimals. Review the procedure given on page 18.
- Students must round decimals to the nearest hundredth in questions 16 to 19.

PRACTICE

Write the decimal.

1. $\frac{401}{1000}$ 0.401 2. $\frac{6}{1000}$ 0.006 3. $\frac{200}{1000}$ 0.200 4. $\frac{88}{1000}$ 0.088 5. $\frac{4805}{1000}$ 4.805

Write as a fraction with a denominator of 1000.

6. 0.468 $\frac{468}{1000}$ 7. 0.375 $\frac{375}{1000}$ 8. 0.17 $\frac{170}{1000}$ 9. 1.362 $\frac{1362}{1000}$ 10. 5.001 $\frac{5001}{1000}$

Copy and complete using < or >.

11. 18.492 \bullet 18.429 > 12. 37.104 \bullet 36.985 >
13. 6.005 \bullet 6.05 < 14. 0.001 \bullet 0.01 <
15. 395.108 \bullet 396.108 < 16. 8.201 \bullet 8.097 >

Round to the nearest hundredth.

17. 0.468 0.47 18. 0.295 0.30 19. 8.095 8.10 20. 5.998 6.00 21. 14.693 14.69

Write the measurement in metres. (1 mm = 0.001 m)

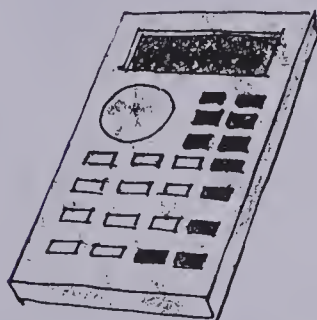
22. 39 mm = \blacksquare m 0.039 23. 156 mm = \blacksquare m 0.156 24. 6 mm = \blacksquare m 0.006
25. 78 mm = \blacksquare m 0.078 26. 1000 mm = \blacksquare m 1.000 27. 8030 mm = \blacksquare m 8.030

28. In Canada, 75 out of 1000 people work for the government.

Write the decimal to show the part of the population that works for the government. 0.075

USING THE CALCULATOR

Display	Operation	Display	Result
289	\div	1000	= <u>0.289</u>
3432	\div	1000	= <u>3.432</u>
86	\div	1000	= <u>0.086</u>
7	\div	1000	= <u>0.007</u>
5864	\div	1000	= <u>5.864</u>
12 592	\div	1000	= <u>12.592</u>



What is the rule?

Move decimal 3 places left.

243

Assigning the Practice

Minimum: 1-24

Average: 1-28

Enriched: 1-28

Reinforcement

1. Assign *Using the Calculator* at the bottom of page 243. After students study the results, they should see that, e.g., $289 \div 1000$ is the same as $\frac{289}{1000}$ or 0.289.

2. Have the students recall how many metres are in a kilometre and then write the following measurements in kilometres.

- CN Tower, Toronto 553 m
- Eiffel Tower, Paris, 300 m
- Sears Tower, Chicago, 443 m
- Empire State Building, New York, 381 m
- Washington Monument, Washington, D.C., 169 m

3. Make 15 decimal playing cards and 15 corresponding fraction playing cards.

0.432

$\frac{432}{1000}$

Use the cards to play "Fish", "Concentration", or for practice in rounding decimals to the nearest hundredth.

Enrichment

1. Have the students research the heights or lengths in metres of the outstanding world structures (buildings, bridges, dams, tunnels, fountains, etc.) from the *Guinness Book of Records*. Then have them indicate each measurement in kilometres.

2. The students can make bar graphs from the information given in the second Reinforcement activity above or from the research done immediately above.

Extra Practice

Worksheet N19

Pages 242-243

Complete each statement.

1. 1 m = 0.001 km 2. 49 m = 0.049 km 3. 148 m = 0.148 km
4. 1 g = 0.001 kg 5. 255 g = 0.255 kg 6. 5 g = 0.005 kg
7. 1 mm = 0.001 m 8. 14 mm = 0.014 m 9. 38 mm = 0.038 m
10. 1 mL = 0.001 L 11. 7 mL = 0.007 L 12. 56 mL = 0.056 L

Solve.

13. The smallest known monkey is the rare feather-tailed tree shrew of Malaysia. An adult shrew has a mass of 35 g to 50 g. What is the shrew's approximate mass in kilograms? 0.035 kg to 0.050 kg
14. The highest waterfall in the world is the Salto Angel Falls in Venezuela. It has a total drop of 979 m. How many kilometres is the drop? 0.979 km
15. The smallest known monkey is the Pygmy marmoset of South America. Half of its length of about 304 mm is tail. How long is the Pygmy marmoset in metres? 0.304 m

UNIT 11 LESSON 2

Objective N20

Regroup tenths, hundredths, and thousandths.

Introducing the Lesson

Use a pocket chart and paper strips to review place value in decimals to thousandths. Focus especially on regrouping activities. Place the following numbers of paper strips in the pocket chart and ask the students to regroup each to a numeral in standard form.

12 ones 18 tenths 20 ones
15 hundredths 22 tenths

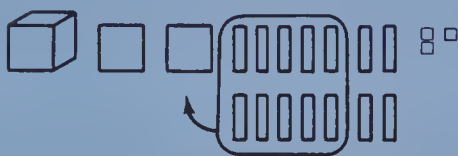
10s	1s	$\frac{1}{10}$ s	$\frac{1}{100}$ s	$\frac{1}{1000}$ s

Teaching the Lesson

Read and discuss the relationship illustrated at the top of page 244. Point out that amounts like 24 tenths are regrouped as 2 ones + 4 tenths, or $2 + 0.4 = 2.4$. The amount 15 hundredths is regrouped as 1 tenth + 5 hundredths or $0.1 + 0.05 = 0.15$.

Have the students use flats, rods, and cubes as they regroup examples like the following. (The block represents **one whole**.)

$$1 + 0.2 + 0.14 + 0.003$$

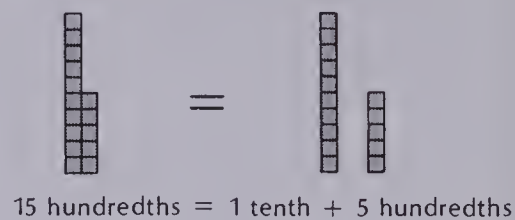
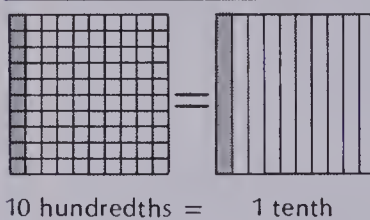
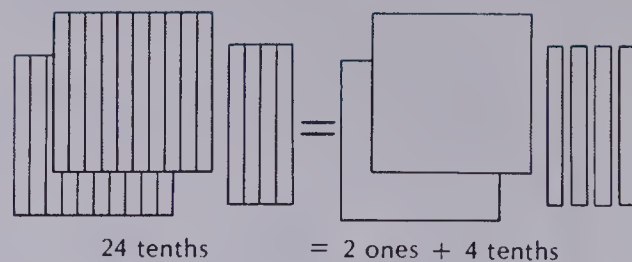
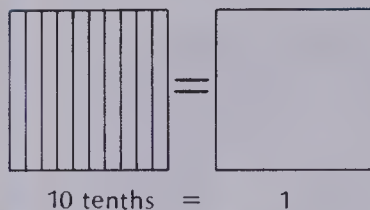


Trade 10 rods for 1 flat.
 $1 + 0.3 + 0.04 + 0.003 = 1.343$

Place paper strips in a place-value pocket chart representing amounts like the following. Ask the students to regroup and then to write each numeral in standard form.

- 4 ones + 5 tenths + 23 hundredths + 8 thousandths
- 2 ones + 1 tenth + 11 hundredths + 15 thousandths
- 5 ones + 12 tenths + 9 hundredths + 21 thousandths

Regrouping



10 thousandths = 1 hundredth
10 hundredths = 1 tenth
10 tenths = 1

EXERCISES

Copy and complete each table.

1.

	ones	tenths
11 tenths	1	1
23 tenths	2	3
49 tenths	4	9
70 tenths	7	0
103 tenths	10	3

2.

	hundredths	thousandths
16 thousandths	1	6
30 thousandths	3	0
56 thousandths	5	6
89 thousandths	8	9
114 thousandths	11	4

Regroup.

- 1 one + 18 tenths = 2 ones + 8 tenths
- 3 tenths + 12 hundredths = 4 tenths + 2 hundredths
- 9 tenths + 32 hundredths = 1 one + 2 tenths + 2 hundredths
- 2 hundredths + 19 thousandths = 3 hundredths + 9 thousandths
- 8 hundredths + 40 thousandths = 1 tenth + 2 hundredths

Using the Exercises

- Questions 1 to 7 provide practice in regrouping tenths, hundredths, and thousandths. Place-value materials should be provided for students having difficulty.

PRACTICE

Regroup and write each numeral in standard form.

	ones		tenths	hundredths	thousandths	
1.	3	.	9	24	16	4.156
2.	0	.	13	2	51	1.371
3.	6	.	40	5	60	10.110
4.	0	.	9	4	1	0.941
5.	0	.	8	127	3	2.073
6.	5	.	0	9	111	5.201

Regroup.

7. 5 tenths + 4 hundredths = 4 tenths + ¹⁴ hundredths
8. 3 ones + 9 tenths = 2 ones + ¹⁹ tenths
9. 1 tenth + 5 hundredths = ⁰ tenths + 15 hundredths
10. 8 hundredths + 0 thousandths = ⁶ hundredths + 20 thousandths
11. 7 tenths + 0 hundredths + 3 thousandths
= ⁷ tenths + 9 hundredths + 13 thousandths

Getting to the Top

Write 1 to 8 in your notebook. Using the diagram below, place a ruler on the dots that join equal values. The ruler will pass through a number and a letter. Write the letters in order to find out how to get to the top.



- 4 tenths • **V** 80 thousandths
- 5 ones • **3** • 1 one + 16 tenths
- 30 thousandths • **A** • 500 hundredths
- 16 tenths • **1** • 3 tenths + 20 hundredths
- 8 hundredths • **8** • 3 tenths + 10 hundredths
- 5 tenths • **O** • 80 tenths
- 2 ones + 6 tenths • **6** • 1 one + 6 tenths
- 8 ones • **L** • 3 hundredths
- 2 • **R** 5
- 4 • **E** 5
- 7 • **T** 4
- **E** 4

ELEVATOR

245

Assigning the Practice

Minimum: 1-3, 7-11

Average: 1-11

Enriched: 1-11

Reinforcement

1. Assign *Getting to the Top* at the bottom of page 245.
2. Write equivalents, such as the pair below, on blank playing cards. Make one "wild" card.

37
hundredths

3 tenths +
7 hundredths

Two players can play this game. The cards are shuffled and dealt five to a player. Leftover cards are placed face down between the players. Players, in turn, ask their opponent for a card. If the opponent has the card, it is given up. If not, the asking player takes a card from the centre pile. Matching cards are kept in the player's pile of winnings. The object of the game is to have the most pairs of cards when the centre pile and the players' hands are exhausted.

3. Ask the students to write the following in standard form.
- a. $50 + 6 + 0.1 + 0.03 + 0.008$
 - b. $900 + 5 + 0.2 + 0.01 + 0.001$
 - c. $3 + 0.4 + 0.009$
 - d. $40 + 0.002 + 0.008$
 - e. $700 + 20 + 3 + 0.004$
 - f. $6 + 0.09 + 0.009$

Enrichment

Have the students complete the following measurement statements.

- $5\text{ cm} + 12\text{ mm} = \underline{\hspace{2cm}}\text{ m}$
- $32\text{ cm} + 8\text{ mm} = \underline{\hspace{2cm}}\text{ m}$
- $4\text{ dm} + 9\text{ cm} + 11\text{ mm} = \underline{\hspace{2cm}}\text{ m}$
- $9\text{ dm} + 12\text{ cm} + 18\text{ mm} = \underline{\hspace{2cm}}\text{ m}$

Extra Practice

Match.

-
1. 12 thousandths
2. 7 ones
3. 0.4
4. 14 tenths
5. 28 thousandths
6. 0.637
7. 34 thousandths
8. 0.050
9. 9 ones
10. 0.34
- 2 hundredths + 14 thousandths
- 4 hundredths + 10 thousandths
- 3 tenths + 4 hundredths
- 60 hundredths + 37 thousandths
- 6 ones + 10 tenths
- 9 thousand thousandths
- 2 tenths + 20 hundredths
- 1 one + 4 tenths
- 1 hundredth + 2 thousandths
- 2 hundredths + 8 thousandths

Worksheet N20

Pages 244-245

Objective A44

Add and subtract thousandths.

Introducing the Lesson

Show two lengths of string which are between 1 m and 2 m long. Ask two students to measure each one to the nearest millimetre with metre sticks or tape and to record the measurement on the chalkboard. Ask, "What is their combined length? What is the difference in their lengths?" Have two other students write the addition and the subtraction on the chalkboard that answer these questions. For example:

$$\begin{array}{r} 1.238 \text{ m} \\ + 1.116 \text{ m} \\ \hline 2.354 \text{ m} \end{array} \quad \begin{array}{r} 1.238 \text{ m} \\ - 1.116 \text{ m} \\ \hline 0.122 \text{ m} \end{array}$$

combined lengths difference in lengths

Teaching the Lesson

Read the lesson example at the top of page 246. Point out that aligning the decimal points also helps one to align tenths with tenths, hundredths with hundredths, and thousandths with thousandths. Proper alignment is essential for correct addition and subtraction.

Show two more lengths of string which are between 1 m and 2 m long. Ask one student to measure one of the strings to the nearest millimetre with a metre stick. Ask another student to measure the second string to the nearest centimetre with a metre stick. Once the measurements have been recorded on the chalkboard, have the students find the combined lengths and the difference between the lengths. Focus on the proper alignment of the tenths, hundredths, and thousandths. For example:

$$\begin{array}{r} 1.68 \text{ m} \\ + 1.625 \text{ m} \\ \hline 3.305 \text{ m} \end{array} \quad \begin{array}{r} 1.680 \text{ m} \\ - 1.625 \text{ m} \\ \hline 0.055 \text{ m} \end{array}$$

combined lengths difference in lengths

Provide more practice in aligning places when adding and subtracting decimals in tenths, hundredths, and thousandths. Use several horizontal examples. Also practise questions needing zeros annexed in the minuend, e.g., $1.4 - 0.692$ or $23.57 - 19.185$.

Adding and Subtracting Thousandths

Add: $14.265 + 8.708$.

<p>Add thousandths. Regroup!</p> $\begin{array}{r} 14.265 \\ + 8.708 \\ \hline 3 \end{array}$	<p>Add hundredths</p> $\begin{array}{r} 14.265 \\ + 8.708 \\ \hline 73 \end{array}$	<p>Add tenths.</p> $\begin{array}{r} 14.265 \\ + 8.708 \\ \hline 973 \end{array}$	<p>Add whole numbers Regroup!</p> $\begin{array}{r} 14.265 \\ + 8.708 \\ \hline 22.973 \end{array}$
---	---	---	---

Subtract: $61.592 - 48.378$.

<p>Subtract thousandths. Regroup!</p> $\begin{array}{r} 61.592 \\ - 48.378 \\ \hline 4 \end{array}$	<p>Subtract hundredths</p> $\begin{array}{r} 61.592 \\ - 48.378 \\ \hline 14 \end{array}$	<p>Subtract tenths.</p> $\begin{array}{r} 61.592 \\ - 48.378 \\ \hline 214 \end{array}$	<p>Subtract whole numbers Regroup!</p> $\begin{array}{r} 61.592 \\ - 48.378 \\ \hline 13.214 \end{array}$
---	---	---	---

When adding or subtracting decimals: **align the decimal points.**

Add or subtract as with whole numbers.

EXERCISES

Find the sum.

- | | | | |
|--|--|--|---|
| 1. 0.523
$+ 0.416$
<u>0.939</u> | 2. 0.382
$+ 0.25$
<u>0.632</u> | 3. 4.579
$+ 1.328$
<u>5.907</u> | 4. 2.415
$+ 3.196$
<u>5.611</u> |
| 5. 12.86
$+ 4.475$
<u>17.335</u> | 6. 45.729
$+ 28.3$
<u>74.029</u> | 7. 632.795
$+ 15.408$
<u>648.203</u> | 8. 286.391
$+ 500.419$
<u>786.810</u> |

Find the difference.

- | | | | |
|--|---|---|---|
| 9. 0.315
$- 0.102$
<u>0.213</u> | 10. 0.82
$- 0.617$
<u>0.203</u> | 11. 4.984
$- 1.697$
<u>3.287</u> | 12. 8.257
$- 2.619$
<u>5.638</u> |
| 13. 47.683
$- 5.2$
<u>42.483</u> | 14. 23.14
$- 16.989$
<u>6.151</u> | 15. 957.104
$- 35.286$
<u>921.818</u> | 16. 167.5
$- 132.948$
<u>34.552</u> |

Using the Exercises

- Questions 1 to 8 provide practice in finding sums of decimal numbers. Stress the importance of aligning each base-ten place and the decimal points.
- Questions 9 to 16 involve finding differences of decimal numbers. Show how zeros need to be added in the minuend of questions 10, 14, and 16.

10. 0.820 $- 0.617$ <u> </u>	14. 23.140 $- 16.989$ <u> </u>	16. 167.500 $- 132.948$ <u> </u>
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PRACTICE

Add or subtract.

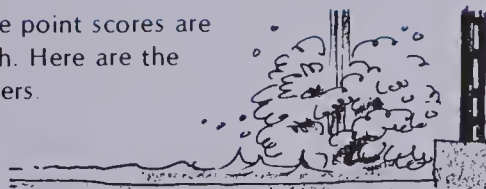
1. $5.368 + 0.421 = 5.789$
2. $56.749 - 30.206 = 26.543$
3. $75.428 + 6.932 = 82.360$
4. $714.58 + 60.932 = 775.512$
5. $0.309 + 0.261 = 0.57$
6. $0.426 - 0.12 = 0.306$
7. $0.450 + 0.1 = 0.550$
8. $43.627 + 5.195 = 48.822$
9. $92.513 - 47.816 = 44.697$
10. $539.2 - 427.817 = 111.383$
11. $92.355 + 83.467 = 175.822$
12. $5.892 - 3.6 = 2.292$
13. $5.682 + 4.237 = 9.919$
14. $73.468 - 1.655 = 71.813$
15. $408.26 - 75.391 = 332.869$
16. $15.833 + 20.694 = 36.527$
17. $60.354 - 38.897 = 21.457$
18. $9.581 - 8.684 = 0.897$
19. $55.0 - 32.109 = 22.891$
20. $600.409 + 80.6 = 681.009$
21. $8.349 + 91.572 = 99.921$
22. $672.001 - 38.435 = 633.566$

Solve.

23. In Olympic Tower Diving, the point scores are kept to the nearest hundredth. Here are the scores of the top three finishers.

Gold	Silver	Bronze
600.51	576.94	548.61

By how much did the gold medalist win? **23.57**

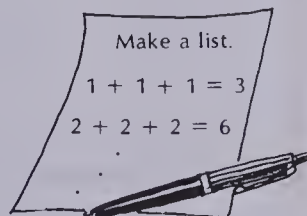


Digits Do It

Each letter represents a different digit. Can you find the digit each letter represents?

$$\begin{array}{l} A=7 \\ B=4 \\ C=0 \\ D=2 \end{array} \quad \text{or} \quad \begin{array}{l} A=3 \\ B=7 \\ C=0 \\ D=1 \end{array}$$

$$\begin{array}{r} AB.CAB \\ AB.CAB \\ + AB.CAB \\ \hline DDD.DDD \end{array}$$



247

Assigning the Practice

Minimum: 1-18, 23

Average: 5-23

Enriched: 5-23

Reinforcement

1. Prepare cards like the following. Ask the students to add each pair of examples and then answer the question.

- a. $47 + 1.35 + 3.419$
b. $0.047 + 13.5 + 34.19$
Which sum is closer to 50?

- a. $2.64 + 3.048 + 265$
b. $200 + 26.4 + 30.48$
Which sum is closer to 250?

- a. $1.6 + 1.908 + 42.85$
b. $16 + 19.08 + 4.285$
Which sum is closer to 41?

2. Since zeros in the minuend frequently pose a problem, provide practice with these subtractions.

- a. $86 - 0.48$
b. $9.1 - 1.758$
c. $305 - 276.194$
d. $2.46 - 0.795$
e. $527 - 25.098$

Enrichment

1. Assign *Digits Do It* at the bottom of page 247. Let the students discuss their problem-solving strategies.

2. Ask the students to estimate the sums and differences of various examples from pages 246 and 247.

Extra Practice

Worksheet A44

Pages 246-247

Add or subtract.

1. $5.7 + 6.348 = 12.048$
2. $9.2 - 4.186 = 5.014$
3. $84 - 0.47 = 83.53$
4. $285.67 + 1478.267 = 1763.937$
5. $7.2 + 89 + 9.36 = 105.56$
6. $900 - 1.32 = 898.68$
7. $92 + 41.36 + 127.117 = 260.477$
8. $567.9 - 429.97 = 137.93$
9. $1147.5 + 965.263 = 2112.763$
10. $265 - 13.487 = 251.513$
11. $27.6 + 95 + 62.384 = 184.984$
12. $1678 - 9.517 = 7.263$

Objective A45

Multiply thousandths by a whole number.

Introducing the Lesson

Use number blocks to illustrate the following counting patterns. Let one block represent one whole.

a. Count by tenths

Show that a flat is 0.1 of a block. Stack flats to make a block and count 0.1, 0.2, 0.3, etc. Ask the students to think of a multiplication for each count, e.g., $1 \times 0.1 = 0.1$, $2 \times 0.1 = 0.2$, $3 \times 0.1 = 0.3$, etc.

b. Count by hundredths

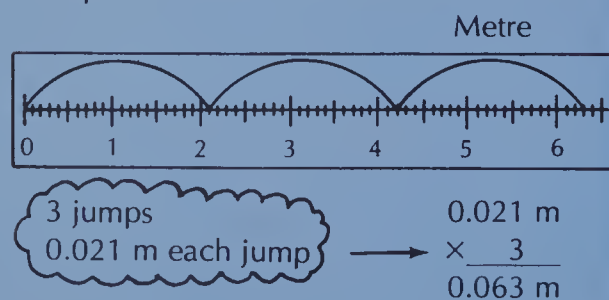
Show a rod as 0.01 of a block. Stack five rods at a time to make a block and count 0.05, 0.10, 0.15, etc. Ask the students to name a multiplication for each count, e.g., $1 \times 0.05 = 0.05$, $2 \times 0.05 = 0.10$, $3 \times 0.05 = 0.15$, etc.

Review the placement of the decimal point in the product (from Unit 9).

Teaching the Lesson

Show the cube as 0.001 of a block. Stack three cubes at a time to form a block, and count 0.003, 0.006, 0.009, etc. Have a student record a multiplication for each count at the chalkboard, e.g., $1 \times 0.003 = 0.003$, $2 \times 0.003 = 0.006$, $3 \times 0.003 = 0.009$, etc. Point out that since there are 3 decimal places in the factors, there are three decimal places in the product.

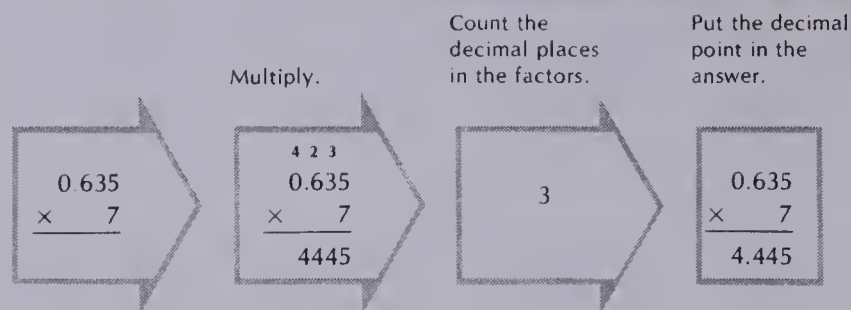
Show a metric ruler with millimetres on an overhead projector. Draw several examples of equal arrow jumps on the ruler. Have the students determine the multiplications illustrated.



Read and discuss the top of page 248. Once it is clear that multiplication is needed for the solution, have the students estimate the product.

Multiplying Thousandths

A pasture should be irrigated to a depth of 0.635 cm of water a day. What is the total depth of water needed in a week?



The total depth of water needed in a week is 4.445 cm.

Check by estimating:

0.635 is about 0.6.

7×0.635 is about 7×0.6 or 4.2.

EXERCISES

Multiply.

1. $\begin{array}{r} 0.2 \\ \times 4 \\ \hline 0.8 \end{array}$	2. $\begin{array}{r} 0.21 \\ \times 4 \\ \hline 0.84 \end{array}$	3. $\begin{array}{r} 0.214 \\ \times 4 \\ \hline 0.856 \end{array}$	4. $\begin{array}{r} 0.3 \\ \times 2 \\ \hline 0.6 \end{array}$	5. $\begin{array}{r} 0.34 \\ \times 2 \\ \hline 0.68 \end{array}$
6. $\begin{array}{r} 0.342 \\ \times 2 \\ \hline 0.684 \end{array}$	7. $\begin{array}{r} 0.7 \\ \times 5 \\ \hline 3.5 \end{array}$	8. $\begin{array}{r} 0.73 \\ \times 5 \\ \hline 3.65 \end{array}$	9. $\begin{array}{r} 0.736 \\ \times 5 \\ \hline 3.680 \end{array}$	10. $\begin{array}{r} 0.692 \\ \times 4 \\ \hline 2.768 \end{array}$
11. $\begin{array}{r} 0.918 \\ \times 2 \\ \hline 1.836 \end{array}$	12. $\begin{array}{r} 0.307 \\ \times 8 \\ \hline 2.456 \end{array}$	13. $\begin{array}{r} 0.572 \\ \times 6 \\ \hline 3.432 \end{array}$	14. $\begin{array}{r} 0.196 \\ \times 7 \\ \hline 1.372 \end{array}$	15. $\begin{array}{r} 0.278 \\ \times 9 \\ \hline 2.502 \end{array}$
16. $\begin{array}{r} 1.079 \\ \times 4 \\ \hline 4.316 \end{array}$	17. $\begin{array}{r} 2.108 \\ \times 5 \\ \hline 10.540 \end{array}$	18. $\begin{array}{r} 3.007 \\ \times 6 \\ \hline 18.042 \end{array}$	19. $\begin{array}{r} 5.040 \\ \times 3 \\ \hline 15.120 \end{array}$	20. $\begin{array}{r} 7.002 \\ \times 7 \\ \hline 49.014 \end{array}$

Using the Exercises

- Questions 1 to 9 are in groups of three; multiplying a whole number by a decimal in tenths, then by a decimal in hundredths, and then by a decimal in thousandths. Encourage the students to round the decimal to tenths and estimate the products. Then have them compute the actual product. This should help them understand the reasonableness of the placement of the decimal point in the product.
- Questions 10 to 20 involve multiplying a decimal in thousandths by a whole number.

PRACTICE

Copy the answer and put in the decimal point.

1.
$$\begin{array}{r} 0.412 \\ \times \quad 5 \\ \hline 2060 \end{array}$$

2.
$$\begin{array}{r} 0.501 \\ \times \quad 7 \\ \hline 3507 \end{array}$$

3.
$$\begin{array}{r} 0.42 \\ \times \quad 8 \\ \hline 336 \end{array}$$

4.
$$\begin{array}{r} 1.91 \\ \times \quad 3 \\ \hline 573 \end{array}$$

5.
$$\begin{array}{r} 0.7 \\ \times 0.6 \\ \hline 0.42 \end{array}$$

Find the product.

6.	$\begin{array}{r} 0.175 \\ \times 2 \\ \hline 0.350 \end{array}$	7.	$\begin{array}{r} 0.086 \\ \times 4 \\ \hline 0.344 \end{array}$	8.	$\begin{array}{r} 0.317 \\ \times 5 \\ \hline 1.585 \end{array}$	9.	$\begin{array}{r} 0.912 \\ \times 7 \\ \hline 6.384 \end{array}$	10.	$\begin{array}{r} 0.086 \\ \times 7 \\ \hline 0.602 \end{array}$
11.	$\begin{array}{r} 0.009 \\ \times 6 \\ \hline 0.054 \end{array}$	12.	$\begin{array}{r} 0.003 \\ \times 3 \\ \hline 0.009 \end{array}$	13.	$\begin{array}{r} 0.017 \\ \times 1 \\ \hline 0.017 \end{array}$	14.	$\begin{array}{r} 0.028 \\ \times 4 \\ \hline 0.112 \end{array}$	15.	$\begin{array}{r} 0.006 \\ \times 5 \\ \hline 0.030 \end{array}$
16.	$\begin{array}{r} 0.178 \\ \times 43 \\ \hline 7.654 \end{array}$	17.	$\begin{array}{r} 0.304 \\ \times 79 \\ \hline 24.016 \end{array}$	18.	$\begin{array}{r} 0.825 \\ \times 81 \\ \hline 66.825 \end{array}$	19.	$\begin{array}{r} 0.143 \\ \times 56 \\ \hline 8.008 \end{array}$	20.	$\begin{array}{r} 0.076 \\ \times 27 \\ \hline 2.052 \end{array}$

Solve.

21. A crop is to be irrigated with 0.895 cm of water each day for a week. What is the depth of the water needed? **6.265 cm**

REVIEW

Copy and complete.

N19 Copy and complete.

1. $0.036 = \frac{\blacksquare}{1000}$ 36

2. $0.587 \bullet 0.593$ <

3. $9 \text{ mm} = \blacksquare \text{ m}$ 0.009

Regroup.

Regroup.

- 3 tenths + 4 hundredths = 2 tenths + ■ hundredths
- 8 hundredths + 2 thousandths = ■ hundredths + 12 thousandths

Add or subtract.

A44	6.	5.698	7.	93.455	8.	7.328	9.	112.05
		+ 0.404		+ 14.58		- 1.609		- 83.156
		<u>6.102</u>		<u>108.035</u>		<u>5.719</u>		<u>28.894</u>

Multiply.

A45 10. $\begin{array}{r} 0.025 \\ \times \quad 5 \\ \hline 0.125 \end{array}$	11. $\begin{array}{r} 6.708 \\ \times \quad 9 \\ \hline 60.372 \end{array}$	12. $\begin{array}{r} 12.095 \\ \times \quad 10 \\ \hline 120.950 \end{array}$	13. $\begin{array}{r} 0.369 \\ \times \quad 28 \\ \hline 10.332 \end{array}$
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Assigning the Practice

Minimum: 1-10, 16-20

Average: 1-5, 11-21

Enriched: 6-21

Review Exercises

Questions	Objective	Pages
1-3	N19	242-243
4-5	N20	244-245
6-9	A44	246-247
10-13	A45	248-249

Reinforcement

1. Give pairs of students a die labelled 2, 3, 4, 5, 6, 7 and a spinner. In turn, students roll the die and spin the spinner to make multiplications to be computed.



- 2.** Have the students model the following multiplications with place-value blocks as in the lesson.

a. 3×0.032 b. 5×0.009
c. 2×1.025 d. 4×1.175

Enrichment

Give each of two or three students a target game board. After a deck of numeral cards labelled 0 to 9 has been shuffled and a target number, such as 15.500, has been set, the students in turn take a card and place it on their game boards. Cards cannot be moved once they have been placed. When a card covers each place on the game board, the students multiply to see who has come closest to the target number.

	□	□	□	□	□	□
		•				
×						□
	□	□	□	□	□	□
		•				

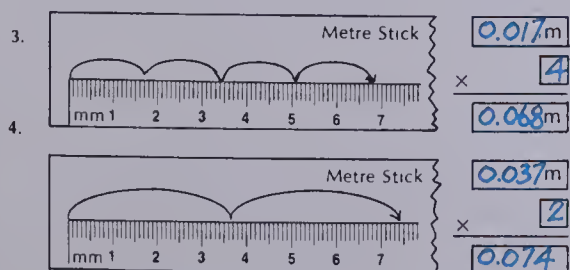
Variation: Use a two-digit multiplier. This requires that the target game boards be altered.

Extra Practice

Continue counting.

- 0.014, 0.028, 0.042, 0.056, 0.070, 0.084, 0.098, 0.112
- 0.025, 0.050, 0.075, 0.100, 0.125, 0.150, 0.175, 0.200

Write the multiplication



Multiply.

5. $4\,175 \times 8$ 6. 0.213×24 7. $8\,647 \times 38$

Worksheet A45

Pages 248-249

Objective A46

Recognize, write, and use rates.

Introducing the Lesson

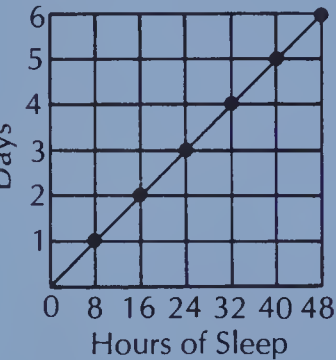
The expression “at that rate” is frequently used by individuals during a description or question. Ask the students to cite some examples of the use of the phrase and to explain what they think the phrase means.

Ask the students how much time they usually spend sleeping in one day. Point out that this is a **rate** that can be stated, e.g., 8 h **per** day. “**At that rate**, how much sleep do you get in 2 days? 3 days? 4 days?”

Teaching the Lesson

Show the students how to make a table and a graph of the above information.

Number of days	1	2	3	4	5	6
Hours of sleep	8	16	24	32	40	48



Read and discuss the lesson example at the top of page 250. Point out that once the **unit rate** is known (15 people **per** trip), one can multiply to find the number of people taken for 2, 3, 4, and more trips. Make a table and a graph of this information.

Ask four students to come to the front of the room. Set out 16 candies. Ask, “How many candies per student?” or “What is the unit rate?” Repeat using 32 candies, 4 candies, 12 candies, etc. Also vary the number of students.

Rates

A tower elevator can take passengers to the top **at the rate** of 15 people **per** trip.

Two trips of the elevator take 2×15 people or 30 people to the top.



EXERCISES

How many people?

- 1. 15 people **per** elevator, 6 elevators **90**
- 2. 12 people **per** elevator, 5 elevators **60**
- 3. 15 people **per** elevator, 8 elevators **120**
- 4. 20 people **per** elevator, 4 elevators **80**

How much money?

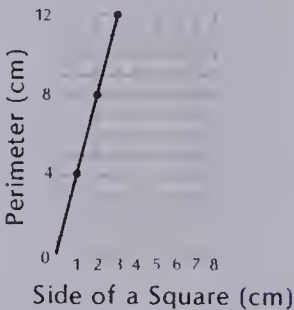
- 5. 15 people, \$3.50 **per** person **\$52.50**
- 6. 15 people, \$1.50 **per** person **\$22.50**
- 7. 8 people, \$2.00 **per** person **\$16.00**
- 8. 6 people, \$1.75 **per** person **\$10.50**

How many objects?

- 9. 100 **per** box, 25 boxes **2500**
- 10. 16 **per** box, 14 boxes **224**
- 11. 25 **per** box, 9 boxes **225**
- 12. 55 **per** box, 45 boxes **2475**

Use the graph to answer the questions.

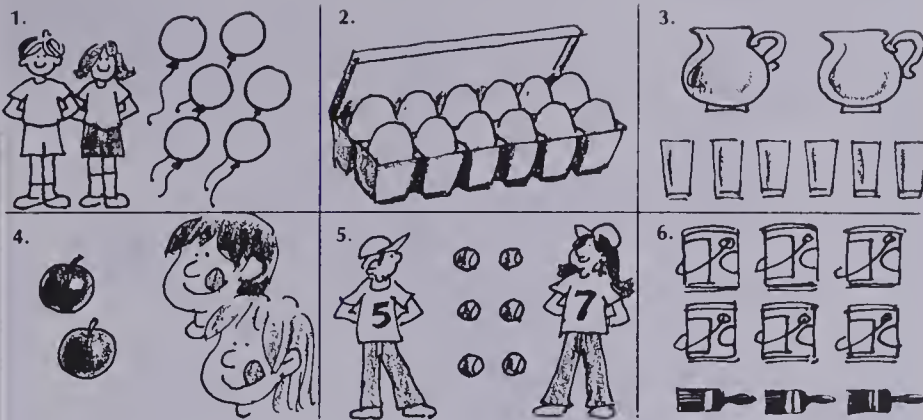
- 13. The length of a side of a square is 3 cm. What is the perimeter? **12**
- 14. If the length of a side is doubled, what happens to the perimeter? **It is doubled.**
- 15. If the length of a side increases by 1 cm, by how much does the perimeter increase? **by 4 cm**



Using the Exercises

- For questions 1 to 12, students are given the unit rate and must multiply to find the amount for more than one.
- Questions 13 to 15 involve using the graphed rate information for an answer.

PRACTICE



1. How many balloons per child? **3**
2. How many eggs per carton? **12**
3. How many glasses per pitcher? **3**
4. How many apples per child? **1**
5. How many balls per child? **3**
6. How many brushes per paint can? **$\frac{1}{2}$**

7. Complete the table and then draw a graph.

Perimeter of a Triangle with 3 Equal Sides

Side in centimetres	1	2	3	4	5	6
Perimeter in centimetres	3	6	9	12	15	18

In the school lunch room, there are 6 children per table.

8. How many children are there at 6 tables? **36**
9. How many tables are needed for 48 children? **8**

Fun with Sums

Each row of numerals follows a pattern.

Which numerals go in the blank squares?

1	4	5	9	14	23	37
3	9	12	21	33	54	87
2	5	7	12	19	31	50

251

Assigning the Practice

Minimum: 1-9

Average: 1-9

Enriched: 1-9

Reinforcement

1. Ask the students to find the **unit rate** for each.

a. $\triangle \triangle \triangle \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$

How many circles per triangle?

b. $\square \square \square \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$

How many circles per square?

c. 28 people sitting at 7 tables.

How many people per table?

d. 72 cans in 3 cases.

How many cans per case?

e. 168 h in 7 days

How many hours per day?

2. Have the students complete the tables and then graph the information.

Number of books	1	2	3	4	5	6
Number of pages	250					

Number of cars	1	3	5	7	9	11
Number of wheels	4					

Number of metres	1	5	10	15	20	25
Number of millimetres	1000					

3. Give each student a sheet of graph paper. Ask them to make a square which has sides 2 cm long. "What is the perimeter of the square?" *Eight centimetres.* Now ask them to double the length of the sides and make another square. "What is the perimeter of this square?" Continue the pattern. Have the students record the information in a table and then graph it.

Sides	2	4	8	16	32
Perimeter	8	16	32	64	128

Enrichment

1. Assign *Fun with Sums* at the bottom of page 251.
2. Have the students make a bulletin board display of various rates they find at school, e.g., 25 children per class, 2 lunch periods per day, 12 people per lunch table, 3 gym classes per week.

Extra Practice

Worksheet A46

Pages 250-251

1. Match.

A

B

- | | | | |
|--------------------|---|---------------------|---|
| 15 min per day | • | 2 goals per game | • |
| 10 min per hour | • | 105 min per week | • |
| 35 min per week | • | 5 min per day | • |
| 5 goals in 2 games | • | 9 goals in 3 games | • |
| 8 goals in 4 games | • | 240 min per day | • |
| 3 goals in 1 game | • | 15 goals in 6 games | • |

2. Solve.

- a. Shaun delivers 64 newspapers per day. How many papers does he deliver in a week? **448**
- b. The average human heart beats about 72 times per minute. How many times will a heart beat in an hour? **4320**

UNIT 11 LESSON 6

Objective A47

Use rates to find and compare prices.

Introducing the Lesson

Show the class a large newspaper ad from a food store. Discuss the prices of the items. Use the term **price rate** as you talk about the ads. Point out prices which are the **unit price** and prices which are for several items.

Teaching the Lesson

Read and discuss the information at the top of page 252. Ask, "What is the **unit price**?" Point out the pattern: 2 rides cost 2 times the unit price; 3 rides cost 3 times the unit price; and so on. Show how equivalent fractions can be used to determine the cost of, say, 8 rides.

$$\frac{\text{rides}}{\text{cost}} = \frac{1}{150\text{¢}} = \frac{1 \times 4}{150 \times 4} = \frac{4}{600\text{¢}}$$

8 rides cost \$6.00.

Point out the cost of four rides in the table and on the graph. Have the students use the equivalent fractions method to calculate the cost of 8 rides, 12 rides, and 20 rides.

Students can use unit prices from newspaper ads to calculate the cost of several items using the equivalent fraction method. Then a table and graph of the information can be made. Stress that when the unit price of an item is known, one multiplies to find the cost of several of the items. For example:

bananas: 95¢ per kilogram

What is the cost of 3 kg?

$$\frac{1 \text{ kg}}{95\text{¢}} = \frac{1 \times 3}{95 \times 3} = \frac{3 \text{ kg}}{285\text{¢}}$$

3 kg cost \$2.85.

Point out the newspaper ads in which the unit price is not stated, e.g., 3 kg of apples for \$1.29. Discuss how the unit price can be found through division by using equivalent fractions.

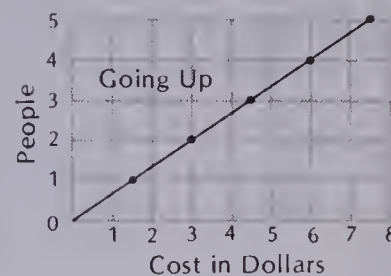
$$\frac{3 \text{ kg}}{129\text{¢}} = \frac{3 \div 3}{129 \div 3} = \frac{1}{43\text{¢}}$$

Price Rates

The charge for the ride to the observation deck of the Space Needle is \$1.50 per person.

People	1	2	3	4	5
Cost	\$1.50	\$3.00	\$4.50	\$6.00	\$7.50

$$(2 \times \$1.50) \quad (3 \times \$1.50)$$



EXERCISES

- Complete the table to show the cost of buffet lunches in the tower dining room. Draw a graph to show the information.

Number of people	1	2	3	4	5
Cost in dollars	\$4	\$8	\$12	\$16	\$20

- Fill in the table to show the number of nickels. Draw a graph to show the relationship.

Number of nickels	20	40	60	80	100
Amount	\$1	\$2	\$3	\$4	\$5

Solve.

- If 1 balloon costs 25¢, then 5 balloons cost ■ \$1.25
- If 1 sack costs 7¢, then 10 sacks cost ■ 70¢
- If 1 card costs 35¢, then 3 cards cost ■ \$1.05
- If 3 cans cost 65¢, then 9 cans cost ■ \$1.95
- If 2 cartons cost \$1.19, then 8 cartons cost ■ \$4.76
- If 10 boxes cost 58¢, then 100 boxes cost ■ \$5.80
- If 1 bag costs \$5, then 5 bags cost ■ \$25
- If 5 m cost \$15, then 15 m cost ■ \$45
- If 16 pieces cost 25¢, then 48 pieces cost ■ 75¢

252

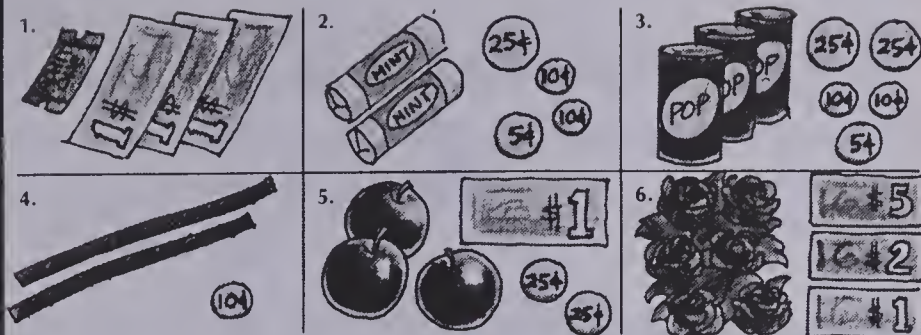
Using the Exercises

- Questions 1 and 2 involve using the pattern in the table to determine the amounts.
- For questions 3 to 11, the students can set up equivalent fractions to determine the costs.

$$\frac{3 \text{ cans}}{65\text{¢}} = \frac{3 \times 3}{65 \times 3} = \frac{9 \text{ cans}}{195\text{¢}}$$

9 cans cost \$1.95.

PRACTICE



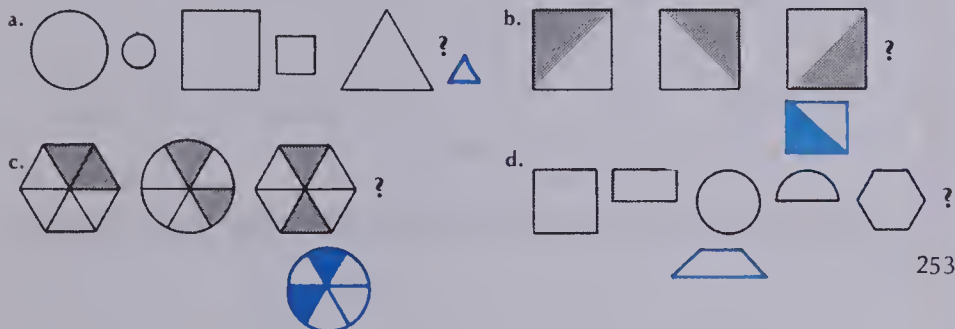
- What is the price per ticket? **\$3.00**
- What is the price per pack? **25¢**
- What is the price per can? **25¢**
- What is the price per licorice stick? **5¢**
- What is the price per apple? **50¢**
- What is the price per flower? **\$1.33**

Solve.

- Lunch in the school cafeteria costs 85¢. Draw a graph to show the cost of lunch for 1 to 5 people.
- John earned \$32.50 each week delivering newspapers. How much does he earn in 4 weeks? **\$130**
- Marylynne was paid \$1.25 per hour to baby-sit. How much did she earn in 7 h? **\$8.75**

Fancy Figures

Copy the pattern and draw the next figure.



253

Assigning the Practice

Minimum: 1-9

Average: 1-9

Enriched: 1-9

Reinforcement

- Place newspaper ads and questions similar to the following on cards for the students to solve.

Cost of cheese: \$5.25 per kilogram
What is the cost of 3 kg?

Cost of tennis balls: 3 for \$5.95
What is the cost per ball?

Cost of carnations: \$8.50 per dozen
What is the cost of 4 dozen?

Encourage the students to look for similar ads and then place them on cards with a question for others to solve.

- Ask the students to make a rate table and a graph showing Pat's baby-sitting salary after 1 h, 2 h, 3 h, 4 h, and 5 h of work, if she gets \$1.50 per hour.

Enrichment

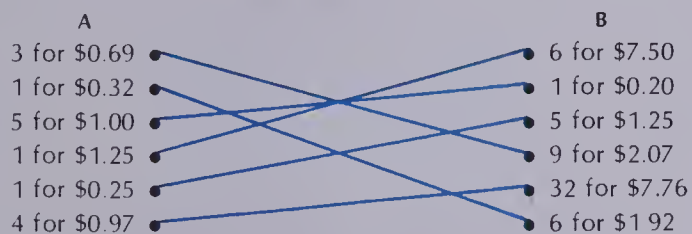
- Assign *Fancy Figures* at the bottom of page 253. Have the students devise other picture patterns for their classmates to complete.
- Have students use newspaper and catalog ads to do some comparative shopping. Discuss the benefits gained from calculating the unit price (so one can determine the better buy). For example:
3 pairs of socks for \$4.50.
5 pairs of socks for \$6.25.
Which is the better buy?

Extra Practice

Worksheet A47

Pages 252-253

- Match.



Complete the table.

2.	Number of people	1	2	5	8	10
	Total cost	\$0.75	\$1.50	\$3.75	\$6.00	\$7.50

3.	Number of cans	3	6	12	21	30
	Total cost	\$1.25	\$2.50	\$5.00	\$8.75	\$12.50

Objective A48

Use rates to find speed.

Introducing the Lesson

Have the students complete the following table.

Cyclist

Time (h)	1	2	3	4
Distance (km)	45			

Discuss the differences in meaning of **time**, **distance**, and **speed**. Point out that the speed (or the rate of travel) is 45 kilometres per hour. Explain that a short way to write this is 45 km/h.

Teaching the Lesson

Point out the *speed* of the Calgary Tower elevator at the top of page 254. Discuss the *time* the elevator takes and the *distance* it travels as shown in the table and graph. Ask a *time* question, e.g., "How long does the elevator take to go 9 m?"; a *distance* question, e.g., "How far does the elevator go in 5 s?"; and a *speed* question, "How fast does the elevator go?"

Pose several more speed, time, and distance questions to the class. Discuss the facts given and the method for solution.

a. A car travels at 88 km/h. How far will it go in 2 h?

Given: speed (88 km/h) and time (2 h)

Looking for: distance

Solution (equivalent fractions):

$$\frac{\text{distance}}{\text{time}} = \frac{88 \text{ km}}{1 \text{ h}} = \frac{88 \times 2}{1 \times 2} = \frac{176 \text{ km}}{2 \text{ h}}$$

Answer: In 2 h, the car goes 176 km.

b. A train travels at 110 km/h. How long will it take to go 440 km?

Given: speed (110 km/h) and distance (440 km)

Looking for: time

Solution (equivalent fractions):

$$\frac{\text{distance}}{\text{time}} = \frac{110 \text{ km}}{1 \text{ h}} = \frac{110 \times 4}{1 \times 4} = \frac{440 \text{ km}}{4 \text{ h}}$$

Answer: It will take the train 4 h to go 440 km.

c. A man drove for 3 h for a distance of 300 km. What was his speed?

Given: time (3 h) and distance (300 km)

Looking for: speed

Solution (equivalent fractions):

$$\frac{\text{distance}}{\text{time}} = \frac{300 \text{ km}}{3 \text{ h}} = \frac{300 \div 3}{3 \div 3} = \frac{100 \text{ km}}{1 \text{ h}}$$

Answer: His speed was 100 km/h.

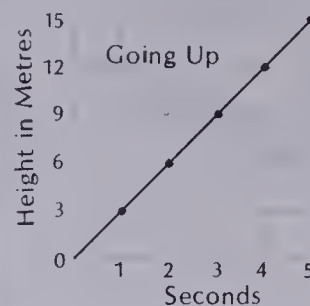
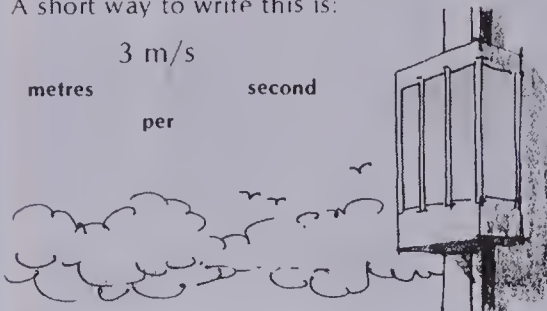
Speed

The Calgary Tower elevator moves at a speed of **three metres per second**

Time (seconds)	1	2	3	4	5
Height (metres)	3	6	9	12	15

A short way to write this is:

3 m/s
metres per second



EXERCISES

Use symbols to write these speeds.

- two centimetres per second **2 cm/s**
- ten kilometres per hour **10 km/h**
- twenty metres per minute **20 m/min**

Symbols	
seconds	s
minutes	min
hours	h

- A car travels 80 km/h.

Car Travel

Number of hours	1	2	3	4	5
Distance in kilometres	80	160	240	320	400

Complete the table and draw a graph to show the results.

Use the table below to answer questions 5 to 7.

An Ostrich Running

Time in minutes	10	20	50	60	90
Distance in kilometres	16	32	80	96	144

- At this speed, how far could an ostrich run in 40 min? **64 km**
- What is the speed of the ostrich in kilometres per hour? **96 km/h**
- The ostrich ran 32 km at this speed.
How long did the ostrich take to run this distance? **20 min**

254

Using the Exercises

- Questions 1 to 3 give the students practice with writing speed. Check that they are using the correct abbreviations.
- Questions 4 to 7 involve using the tables to name speed, time, and distance. Explain how equivalent fractions can be used to answer some of the questions, e.g., question 5.

Given: speed (16 km in 10 min)
time (40 min).

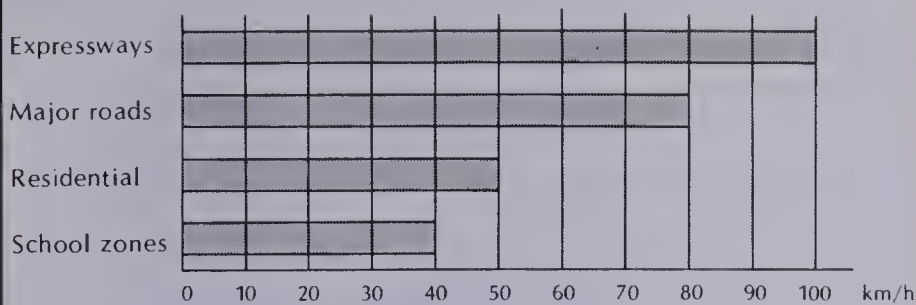
Looking for: distance

$$\text{Solution: } \frac{\text{distance}}{\text{time}} = \frac{16 \text{ km}}{10 \text{ min}} = \frac{16 \times 4}{10 \times 4} = \frac{64 \text{ km}}{40 \text{ min}}$$

Answer: In 40 min, the ostrich can run 64 km.

PRACTICE

City Speed Limits



- What is the speed limit in kilometres per hour in a school zone? **40 km/h**
 - If a car could travel in residential areas at maximum speed for 30 min, how far would it travel? **25 km**
 - Make a table to show the total distance travelled on major roads at maximum speed during five hours.
 - In four hours, how much farther could a car travel on an expressway than on a residential road? **200 km**
- Solve.
- An elevator rises 180 m in 60 s. At that speed, how long would it take the elevator to rise 60 m? **20 s**

Logical Thoughts

Accept the first statement as being true.

Which of the next two statements must also be true?

- Radio towers are over 200 m tall.
 - This tower is over 200 m tall, so it must be a radio tower.
 - This is a radio tower, so it must be over 200 m tall.**
- All the boys in the class have blue eyes.
 - John is in the class, so he has blue eyes.**
 - Raymond has blue eyes, so he is a member of the class.

255

Assigning the Practice

Minimum: 1-5
Average: 1-5
Enriched: 1-5

Reinforcement

1. Have the students tell whether each represents a speed, a time, or a distance.

- | | |
|--------------|-------------|
| a. 12 h | b. 500 km/h |
| c. 420 km | d. 85 m |
| e. 8 s | f. 5 m/s |
| g. 15 m | h. 4 min |
| i. 112 m/min | j. 88 km |

2. In physical education class, have the students run as fast as they can for 10 s. Measure the distance and find the speed in metres per second.

3. Use a provincial map on which distances between cities are given in kilometres. Have the students approximate the time required to drive between various pairs of cities using the speed limits given on page 255.

Enrichment

1. Assign *Logical Thoughts* at the bottom of page 255.

2. Have the students research the speed of various animals. Display the findings. Use the facts on speed to devise story problems.

Extra Practice

Complete the table.

Worksheet A48

Pages 254-255

	Distance	Time	Speed
1.	100 km	2 h	50 km/h
2.	450 km	5 h	90 km/h
3.	60 km	3h	20 km/h
4.	500 km	10 h	50 km/h
5.	400 m	10 s	40 m/s
6.	1500 m	500s	3 m/s

Solve.

- A runner ran 100 m in 10 s. What was the runner's speed in metres per second? **10 m/s**
- A swimmer averaged 2 m/s for 50 s. How far did the swimmer go? **100 m**
- A car drove 270 km at a speed of 90 km/h. How long did it take? **3 h**

Objective N21

Understand the meaning of percent.

Introducing the Lesson

Have ready 10 by 10 grids and a set of 100 Centicubes. Make several displays like the following on an overhead projector.

- Show a 10 by 10 grid with 35 squares shaded.
- Show a set of 100 Centicubes (arranged in 10 rows of 10 each) with 4 cubes separated from the rest.

For each display, ask the students to name and record the fraction and decimal that represents the shaded (or separated) part, for example,

$$\frac{35}{100} \text{ or } 0.35 \quad \frac{4}{100} \text{ or } 0.04$$

Explain that these fractional parts of one whole can also be expressed as percents: 35% or 4%. Point out that **percent** means **per hundred**.

Teaching the Lesson

Give the students a worksheet of several 10 by 10 grids. Have them illustrate these percents: 72%, 50%, 2%, and 100%. Ask them to label each illustration with the appropriate fraction, decimal, and percent. Discuss how 125% would be illustrated. "Is it more than one whole? How is it written as a fraction and as a decimal?"

Give the students a quick quiz of 100 multiplication facts. Call out the answers as the students check their own work. Show them how to write the number of correct answers out of the 100 facts as a fraction, a decimal, and a percent.

Read and discuss the top of page 256. If necessary, the problem can be modelled with Centicubes on the overhead projector.

Percent

100 people visited the tower.
23 of the visitors were children.
What **percent** of the visitors were children?

$\frac{23}{100}$ of the visitors were children.
0.23 of the visitors were children.
23% of the visitors were children.

Percent means "per hundred".
The symbol for percent is %.



EXERCISES

Write each fraction as a percent.

- $\frac{16}{100}$ 16%
- $\frac{72}{100}$ 72%
- $\frac{39}{100}$ 39%
- $\frac{64}{100}$ 64%
- $\frac{25}{100}$ 25%
- $\frac{45}{100}$ 45%
- $\frac{89}{100}$ 89%
- $\frac{91}{100}$ 91%
- $\frac{113}{100}$ 113%
- $\frac{135}{100}$ 135%

Write each decimal as a percent.

- 0.16 16%
- 0.91 91%
- 0.04 4%
- 0.50 50%
- 0.43 43%
- 0.38 38%
- 0.02 2%
- 0.70 70%
- 1.15 115%
- 1.79 179%

Write each percent as a fraction with a denominator of 100.

- 52% $\frac{52}{100}$
- 33% $\frac{33}{100}$
- 94% $\frac{94}{100}$
- 7% $\frac{7}{100}$
- 48% $\frac{48}{100}$
- 75% $\frac{75}{100}$
- 26% $\frac{26}{100}$
- 19% $\frac{19}{100}$
- 69% $\frac{69}{100}$
- 81% $\frac{81}{100}$

Write each percent as a decimal.

- 1% 0.01
- 2% 0.02
- 5% 0.05
- 8% 0.08
- 10% 0.10
- 20% 0.20
- 50% 0.50
- 90% 0.90
- 100% 1.00
- 200% 2.00
- 21% 0.21
- 52% 0.52
- 95% 0.95
- 108% 1.08
- 210% 2.10

Using the Exercises

- Questions 1 to 10 require the students to write a fraction as a percent. Note that some percents will be over 100.
- Questions 11 to 20 involve writing decimals as percents. The students should see that those decimals having a zero in the ones place are less than 100%.
- Questions 21 to 30 involve writing percents as fractions with a denominator of 100. Students should think, "52% means 52 per 100, 33% means 33 per hundred."
- Questions 31 to 45 require the students to write a percent as a decimal. Students should think, "95% is 95 hundredths, 108% is 108 hundredths."

PRACTICE

- Copy and complete the table.

	Fraction with Denominator of 100	Decimal	Percent
a.	$\frac{50}{100}$	0.50	50%
b.	$\frac{30}{100}$	0.30	30%
c.	$\frac{19}{100}$	0.19	19%
d.	$\frac{25}{100}$	0.25	25%
e.	$\frac{190}{100}$	1.90	190%
f.	$\frac{150}{100}$	1.50	150%
g.	$\frac{250}{100}$	2.50	250%
h.	$\frac{37}{100}$	0.37	37%
i.	$\frac{64}{100}$	0.64	64%
j.	$\frac{7}{100}$	0.07	7%

Solve.

- Rob scored 94 out of 100 questions correct on an arithmetic test. What percent of the questions did Rob answer correctly? **94%**
- In a group of 100 students, 73 have visited the observation deck of a tower. What percent of the students have been on the deck of a tower? **73%**

Movie Expenses

- What was the major cost of attending the movie? **Ticket**
- On what was the least amount of money spent? **Bus**
- What two expenses together cost the same as one other expense? **Bus + drink = Food**
- What percent of the total was spent on food and drink? **50%**
- Did food and drink cost more than the movie ticket? **No**
- What is the total percent shown? **100%**



257

Assigning the Practice

Minimum: 1
Average: 1-3
Enriched: 1-3

Reinforcement

- Provide 10 by 10 grids for the students to illustrate various percents.
- Give the students a fact quiz of 100 facts. After the quizzes are scored, have the students record each other's score and write the appropriate percents of correct facts.
- Draw a 1 m line segment on the chalkboard and mark the 100 cm. Ask the students to draw line segments in coloured chalk, above the 1 m segment, that are 62%, 5%, 100%, 50%, 95%, and 20% as long as 1 m.

Enrichment

- Assign *Movie Expenses* at the bottom of page 257.
- Ask the students to remake the circle graph on page 187 using percents instead of fractions.

Extra Practice

Shade each part of a whole.

Write each as a fraction, decimal, and percent.

<p>1.</p> <p>fraction: $\frac{65}{100}$ decimal: 0.65 percent: 65%</p>	<p>2.</p> <p>fraction: $\frac{27}{100}$ decimal: 0.27 percent: 27%</p>	<p>3.</p> <p>fraction: $\frac{9}{100}$ decimal: 0.09 percent: 9%</p>
<p>4.</p> <p>fraction: $\frac{30}{100}$ decimal: 0.30 percent: 30%</p>	<p>5.</p> <p>fraction: $\frac{8}{100}$ decimal: 0.08 percent: 8%</p>	<p>6.</p> <p>fraction: $\frac{75}{100}$ decimal: 0.75 percent: 75%</p>

Worksheet N21

Pages 256-257

UNIT 11 LESSON 9

Objective A49

Find the percent of a number.

Introducing the Lesson

Review the meaning of percent as per hundred, e.g., 85% means 85 per hundred, 85 hundredths, or 0.85. Have the students say aloud the meanings of the following percents (as above) as they change them to a decimal.

60% 43% 17% 96%

The students should notice the pattern that when changing a percent to a decimal, the percent sign is removed and the decimal point is moved two places to the left.

Teaching the Lesson

Place 100 Centicubes on an overhead projector. Ask, "What is 10% of them?" Show how the completion of the following three solutions is the same since the fraction, decimal, and percent are equal.

$$\frac{10}{100} \text{ of } 100 = 10 \quad 0.10 \times 100 = 10$$

$$10\% \times 100 = 10$$

"What is 70% of the 100 Centicubes?"

$$\frac{70}{100} \text{ of } 100 = 70 \quad 0.70 \times 100 = 70$$

$$70\% \times 100 = 70$$

Repeat with other percents, e.g., 38%.

Let the students discover that multiplying with the decimal equivalent is the easiest method.

Relate finding the percent of the number 100 to real-life situations.

a. \$100 is invested at a bank at 12% interest. How much interest is gained after one year?

b. Glue costs \$4. Sales tax is 7% of the purchase. What is the amount of sales tax?

Have the students compute the following. Point out that a percent of a number is not always an even whole number.

48% of 35 96% of 78

Percent of a Number

The C.N. Tower in Toronto is about 553 m tall.

Elevators go up about 65% of the height. What height can you reach on an elevator?

Change the percent to a decimal.

Multiply

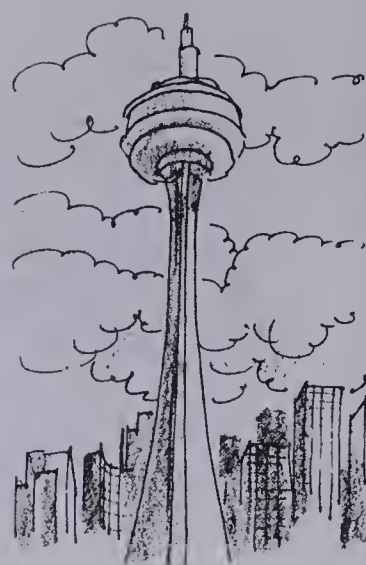
Round

$$65\% = 0.65$$

$$\begin{array}{r} 553 \\ \times 0.65 \\ \hline 359.45 \end{array}$$

360

The elevator reaches about 360 m.



EXERCISES

Write each percent as a decimal.

1. 14% **0.14** 2. 67% **0.67** 3. 3% **0.03** 4. 21% **0.21** 5. 96% **0.96**
6. 33% **0.33** 7. 5% **0.05** 8. 84% **0.84** 9. 55% **0.55** 10. 16% **0.16**
11. 40% **0.40** 12. 75% **0.75** 13. 39% **0.39** 14. 1% **0.01** 15. 50% **0.50**

Compute.

16. 10% of 90 **9** 17. 10% of 48 **4.8** 18. 10% of 39 **3.9**
19. 100% of 80 **8** 20. 100% of 17 **17** 21. 100% of 100 **100**
22. 1% of 300 **3** 23. 1% of 360 **3.6** 24. 1% of 1000 **10**
25. 25% of 40 **10** 26. 25% of 60 **15** 27. 25% of 20 **5**
28. 81% of 85 **68.85** 29. 81% of 59 **47.79** 30. 81% of 38 **30.78**
31. 109% of 31 **33.79** 32. 50% of \$70 **\$35** 33. 25% of \$52 **\$13**
34. 75% of \$80 **\$60** 35. 50% of \$45 **\$22.50** 36. 33% of \$66 **\$22**
37. 20% of \$92 **\$18.40** 38. 3% of \$3 **\$0.09** 39. 5% of \$65 **\$3.25**
40. 60% of \$342 **\$205.20** 41. 54% of \$775 **\$418.50** 42. 90% of \$845 **\$760.50**

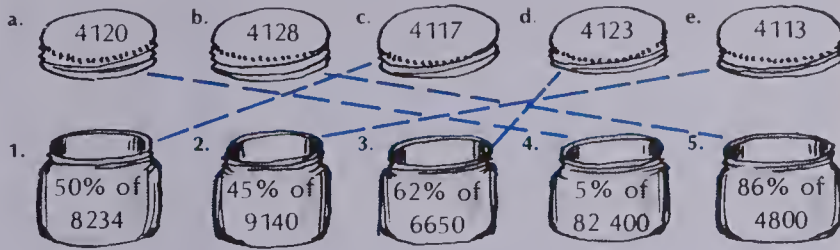
Using the Exercises

- Questions 1 to 15 review the skill of writing a percent as a decimal.
- Questions 16 to 42 involve finding the percent of a number. Discuss the patterns.

10% of 90 = 9	100% of 80 = 80	1% of 300 = 3
10% of 48 = 4.8	100% of 17 = 17	1% of 360 = 3.6
10% of 39 = 3.9	100% of 100 = 100	1% of 1000 = 10

PRACTICE

Match the lids and jars.



Compute.

6. 10% of \$30 **\$3** 7. 65% of 90 cm **58.5 cm** 8. 5% of 60 questions **3**
 9. 91% of 200 g **182 g** 10. 33% of \$16 **\$5.28** 11. 150% of 70 **105**

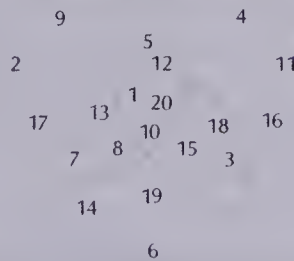
Solve.

12. 950 people visited an observation tower.
 a. 42% of the visitors were children.
 How many children visited the tower? **399**
 b. 30% of the visitors were men.
 How many of the visitors were not men? **665**
13. There were 80 questions on an arithmetic test.
 a. Gwen received a mark of 95%.
 How many questions did she answer correctly? **76**
 b. Raymond answered 72 of the questions correctly.
 What percent of the questions did Raymond get wrong? **10%**

Intersecting Circles

Write the numerals that are in exactly two of the circles.

3, 5, 7, 8, 12, 13, 15, 18.



259

Assigning the Practice

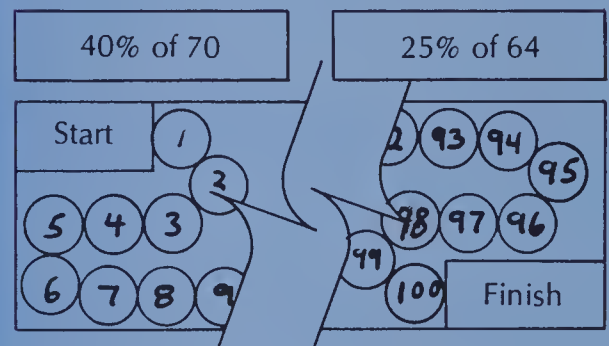
Minimum: 1-11
 Average: 1-12
 Enriched: 1-13

Reinforcement

1. Have the students complete the following and note the percent family patterns.

- a. 20% of 35
 40% of 35
 60% of 35
 80% of 35
 100% of 35
- b. 25% of 32
 50% of 32
 75% of 32
 100% of 32
- c. 5% of 200
 10% of 200
 15% of 200
 20% of 200
 25% of 200
 etc.
- d. 10% of 15
 20% of 15
 30% of 15
 40% of 15
 50% of 15
 etc.

2. Make a game board numbered from 1 to 100. Prepare cards similar to the following. In turn, students take a card; compute the percent of a number; and, if correct, advance a marker that amount of spaces on the board. The first player to finish is the winner.



3. Have the students complete the following chart.

Money Invested	Percent of Interest	Amount of Interest After 1 Year
\$2000	15%	
\$140	13%	
\$5000	18%	

Enrichment

1. Assign *Intersecting Circles* at the bottom of page 259. Ask, also, "Which numbers are in all three circles? in only one circle?"

2. Display items from a catalog. Have the students mark the sale price if each item is discounted 25%.

Extra Practice

Worksheet A49

Pages 258-259

What is the amount of discount for each?

40% DISCOUNT			
Ski \$250 \$100	Bicycle \$115 \$46	Tennis Racquet \$65 \$26	Canoe \$850 \$340
Ski Boots \$160 \$64	Tent \$560 \$224	Tennis Balls \$6 \$2.40	Life Jacket \$55 \$22

Objective PS10

Solve two-step problems.

Introducing the Lesson

Review the use of the **IDEA** strategy to solve one-step problems. Emphasize the importance of each step.

Teaching the Lesson

Pose the following two-step problems. Show the students how to use the **IDEA** strategy for each step. Discuss the **Decide** steps thoroughly. Point out that it is usually best to do the step involving the most facts first.

a. What is the total cost of 2 bags of chips at 29¢ each and 1 bag of popcorn at \$1.99?

Decide

Step 1

Find the cost of both bags of chips. → Multiply $2 \times 29\text{¢}$. (This involves using two facts.)

Step 2

Find the total cost. Add $\$0.58 + \1.99 .

b. Jane bought a dress that was marked down 25% from the regular price of \$48. What is the sale price?

Decide

Step 1

Find the amount marked down (or discount). Multiply $25\% \times \$48$. (This involves two facts.)

Step 2

Find the sale price. → Subtract $\$48 - \12 .

Read and discuss the two-step problem at the top of page 260. Work through the given **IDEA** strategy.

Two-Step Problems



During a winter sale, Jodi bought a sweater for \$36. She paid a sales tax of 7% on her purchase. How much did she pay altogether?

a. **Identify:** cost = \$36; sales tax = 7%.

Decide: "7%" tells us to choose \times .

Evaluate: $0.07 \times 36 = 2.52$

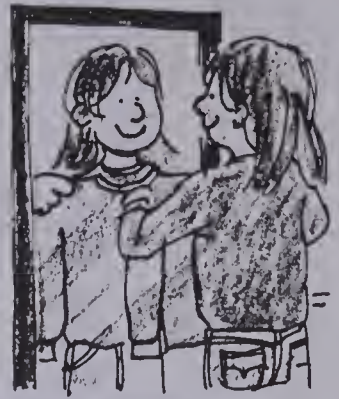
Answer: The sales tax is \$2.52.

b. **Identify:** sales tax = \$2.52; cost = \$36.

Decide: "pay altogether" tells us to choose $+$

Evaluate: $\$36.00 + \$2.52 = \$38.52$.

Answer: She paid \$38.52 altogether.



EXERCISES

Copy and complete.

1. A store repacks a carton of 120 apples in bags of 6. Each bag sells for \$1.65. How much does the store receive for the carton of apples?

Step 1: $120 \div 6 = 20$

2: $20 \times \$1.65 = \33.00

3. Vic bought a used car for \$3860 and spent \$795 to repair it. Then he sold it for \$3525. How much did he lose on the car?

Step 1: $3860 + 795 = 4655$

2: $4655 - 3525 = \$1130$

5. A store bought 43 L of paint for \$4.63/L and sold it for \$8.25/L. What was the total profit?

\$155.66

2. A service station buys gas for 39.4¢/L and sells it for 42.0¢/L. How much profit is made on a sale of 120 L?

Step 1: $42.0 - 39.4 = 2.6$

2: $2.6 \times 120 \text{ L} = \3.12

4. Three partners bought a house for \$88 300 and later sold it for \$95 200. How much profit did each partner make?

Step 1: $95\ 200 - 88\ 300 = 6900$

2: $6900 \div 3 = \$2300$

6. There are 4 engines on a rocket. Each engine burns 75.4 L/min. How much fuel is burned in 3 min?

904.8 L

Using the Exercises

- Use questions 1 to 6 as an oral guided exercise. Have the students apply the **IDEA** strategy to each problem-solving step. Encourage them to use most of the facts in Step 1. The first four questions have Step 1 already completed. Discuss how two known facts were used in Step 1 in each case.

PRACTICE

Solve.

- Mr. and Mrs. Swartz listed their home with a real estate broker for \$78 950. In order to sell it, they reduced the price by \$3950. How much money did they receive after paying the broker's fee of \$4500? **\$70500**
- A corner store bought 5 cartons of 24 cans of apple juice and then sold all the drinks individually for 42¢ each. How much money did the store owner receive? **\$50.40**
- If a deep-well pump can draw 50 L/min, how many hours will it take to fill a 27 000 L tank? **9h**
- Ralph's parents just bought a \$895 television set for their family room. They paid a sales tax of 4%. How much did the set cost altogether? **\$930.80**

REVIEW

- | | | |
|-----|--|--|
| A46 | 1. 6 cars
5 people per car
How many people? 30 | 2. 23 buses
1035 people
How many people per bus? 45 |
| A47 | 3. 3 cans cost 75¢.
How much for 12 cans? \$3.00 | 4. 6 apples cost \$1.80.
How much per apple? 30¢ |
| A48 | 5. A car goes 180 km in 3 h.
What is the speed in kilometres per hour? 60 km/h | |
| N21 | Write the percent.
6. $\frac{12}{100}$ 12% 7. $\frac{75}{100}$ 75% 8. 0.02 2% 9. 0.35 35% 10. 0.50 50% | |
| A49 | Compute.
11. 10% of 80 8 12. 65% of 50 32.5 13. 25% of 128 32 | |

261

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-2	A46	250-251
3-4	A47	252-253
5	A48	254-255
6-10	N21	256-257
11-13	A49	258-259

Reinforcement

1. Cut out pictures of items and their prices from catalogs. Attach them to a spinner, as shown below. Students are to spin twice and then find the total cost including sales tax.



2. Have the students complete the following tables.

Regular Price	Percent of Discount	Amount of Discount	Sale Price
\$25	10%		
\$48	25%		
\$265	40%		
\$950	30%		
\$3850	20%		

Cost of Item	Sales Tax	Total Cost
\$4	4%	
\$19	6%	
\$136	7%	
\$879	5%	
\$5625	7%	

Enrichment

Provide the students with a list of deposits and withdrawals from a monthly statement for a chequing account. Give them the opening balance and ask them to compute the closing balance.

Problem Solving Activities

Assign Level 5, Unit 11.

Extra Practice

Worksheet PS10

Pages 260-261

Solve.

- The speedometer on Harry's rental car showed 23 456 km when he left the lot and 23 965 km when he returned. If he paid a flat rate of 25.6¢/km, what did the rental car cost? **\$130.30**
- Sandy bought a sports car listed at \$9870 at a discount of 10%. How much did she pay for the car? **\$8883**
- Sydney bought a \$300 camera. He paid 7% sales tax on his purchase. How much did he pay altogether? **\$321**
- Four partners bought a sailboat for \$32 500 and later sold it for \$34 000. How much profit did each partner make? **\$375**

Unit 11 Objective	Test Questions	Pages
N19	1-10	242-243
N20	11-13	244-245
A44	14-17	246-247
A45	18-21	248-249
A46	22	250-251
A47	23	252-253
A48	24	254-255
N21	25-34	256-257
A49	35-37	258-259

TEST

UNIT 11

Write as a decimal.

1. $\frac{315}{1000}$ **0.315** 2. $\frac{29}{1000}$ **0.029** 3. $\frac{680}{1000}$ **0.680** 4. $\frac{4}{1000}$ **0.004** 5. $\frac{2143}{1000}$ **2.143**

Round each decimal to the nearest tenth and hundredth.

6. 0.458 **0.5** 7. 3.216 **3.2** 8. 70.809 **70.8** 9. 584.992 **585.0** 10. 0.167 **0.2**
0.46 **3.22** **70.81** **584.99** **0.17**

Write as a decimal.

11. 3 tenths + 9 hundredths + 14 thousandths **0.404**
 12. 1 ten + 12 ones + 11 tenths + 20 hundredths **23.3**
 13. 5 ones + 3 tenths + 7 hundredths + 45 thousandths **5.415**

Compute.

14. $\begin{array}{r} 18.462 \\ + 9.507 \\ \hline 27.969 \end{array}$ 15. $\begin{array}{r} 33.621 \\ + 78.479 \\ \hline 112.100 \end{array}$ 16. $\begin{array}{r} 5.613 \\ - 3.274 \\ \hline 2.339 \end{array}$ 17. $\begin{array}{r} 24\ 837 \\ - 11\ 619 \\ \hline 13\ 218 \end{array}$
 18. $\begin{array}{r} 0.315 \\ \times 6 \\ \hline 1.890 \end{array}$ 19. $\begin{array}{r} 0.087 \\ \times 4 \\ \hline 0.348 \end{array}$ 20. $\begin{array}{r} 0.381 \\ \times 10 \\ \hline 3.810 \end{array}$ 21. $\begin{array}{r} 0.205 \\ \times 23 \\ \hline 4.715 \end{array}$

Solve.

22. 6 apples
 2 per child
 How many children? **3**
 23. 24¢
 4 children
 How much per child? **6¢**
 24. A car is travelling at 50 km/h.
 How far will it go in 4 h? **200 km**

Write as a percent.

25. 0.14 **14%** 26. 0.86 **86%** 27. 0.03 **3%** 28. 1.00 **100%** 29. 1.27 **127%**

Write each percent as a fraction with a denominator of 100.

30. 36% **$\frac{36}{100}$** 31. 5% **$\frac{5}{100}$** 32. 98% **$\frac{98}{100}$** 33. 17% **$\frac{17}{100}$** 34. 100% **$\frac{100}{100}$**

Solve.

35. 20% of 60 = **12** 36. 50% of 37 = **18.5** 37. 40% of 50 = **20**

Post-test

Unit 11

Write as a decimal.

1. $\frac{236}{1000}$ **0.236** 2. $\frac{29}{1000}$ **0.029** 3. $\frac{7}{1000}$ **0.007** 4. $\frac{85}{1000}$ **0.085** 5. $\frac{9150}{1000}$ **9.150**

Round each decimal to the nearest hundredth.

6. 0.317 **0.32** 7. 0.925 **0.93** 8. 56.413 **56.41** 9. 896.776 **896.78** 10. 8.465 **8.47**

Write as a decimal.

11. 7 tenths + 8 hundredths + 19 thousandths **0.799**
 12. 4 tens + 16 ones + 11 tenths + 35 hundredths **17.85**
 13. 4 ones + 18 tenths + 22 hundredths + 13 thousandths **6.033**

Compute.

14. $\begin{array}{r} 25.42 \\ + 8.965 \\ \hline 34.385 \end{array}$ 15. $\begin{array}{r} 49.782 \\ + 36.67 \\ \hline 86.452 \end{array}$ 16. $\begin{array}{r} 5.735 \\ - 2.18 \\ \hline 3.555 \end{array}$ 17. $\begin{array}{r} 4.7 \\ - 2.614 \\ \hline 2.086 \end{array}$

GEOMETRY

Name each figure.

1. **Line segment AB**

2. **Point P**

3. **Line CD**

4. **Ray XY**

5. **Triangle ABC**

6. **Pentagon UVWXY**

7. **Rectangle EFGH**

8. **Square MNOP**

9. **Hexagon QRSTUV**

Name the motion (slide, flip, or turn).

10. **Slide**

11. **Turn**

12. **Flip**

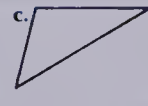
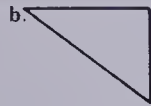
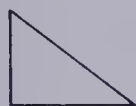
13. What figure has a line of symmetry?

a. **U**

b. **Q**

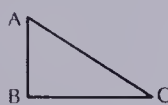
c. **W**

14. Which triangle is congruent to the first one? **b.**



15. Name all the matching points and sides in these congruent triangles.

A and F
B and E
C and D



AB and FE
BC and ED
AC and FD

263

18. 0.264

$$\begin{array}{r} \times 3 \\ 0.792 \end{array}$$

19. 0.057

$$\begin{array}{r} \times 9 \\ 0.513 \end{array}$$

20. 7.608

$$\begin{array}{r} \times 12 \\ 91.296 \end{array}$$

21. 3.417

$$\begin{array}{r} \times 25 \\ 85.425 \end{array}$$

Solve.

22. 8 cans per box.

How many cans in 12 boxes? **96**

23. 5 roses cost \$2.99.

What will 30 roses cost?

\$17.94

24. A car travels at 85 km/h.

How long will it take to go 340 km? **4 h**

Write as a percent.

25. 0.35 **35%** 26. 0.72 **72%** 27. 1.00 **100%** 28. 0.04 **4%** 29. 1.38 **138%**

Write each percent as a fraction with a denominator of 100.

30. 43% **$\frac{43}{100}$** 31. 9% **$\frac{9}{100}$** 32. 100% **$\frac{100}{100}$** 33. 76% **$\frac{76}{100}$** 34. 240% **$\frac{240}{100}$**

Solve.

35. 75% of 16 = **12** 36. 20% of 45 = **9** 37. 15% of 180 = **27**

UNIT 12

Applications

Theme: Transportation

Lesson		Objective	Pages
Preview		Review the metric system prefixes.	265
1	A50	Find the average of a set of numbers.	266–267
2	M15	Add and subtract money.	268–269
3	M16	Count change up to \$20.00.	270–271
4	PS11	Estimate answers in solving measurement problems.	272–273
5	G10	Identify figures that are similar.	274–275
6	G11	Draw similar figures; enlarge figures.	276–277
7	G12	Interpret and make scale drawings.	278–279
8	M17	Read timetables.	280–281
9	M18	Use a time zone map.	282–283
10	PS12	Solve problems involving time and money.	284–285
Test		Applications	286
Review		Decimals	287

About This Unit

The work of Unit 12 is rich in meaningful, real-life, mathematical situations. As previously-learned arithmetical skills are extended, they are applied to everyday experiences.

- a. Students measure and compute average heights or average class size as part of Lesson 1's activities.
- b. Addition and subtraction of money skills are applied to computing the end-of-the-month balance for a chequing account in Lesson 2.
- c. Students act as cashiers and count change in Lesson 3.
- d. The practicality of estimating measurements, e.g., the amount of carpeting needed, is pointed out in Lesson 4.
- e. Lessons 5 and 6 deal with similar and enlarged figures. Students learn how to enlarge figures proportionally.
- f. Interpreting scales and using them to determine lengths and distances on scale drawings is the focus of Lesson 7.
- g. Lessons 8 and 9 extend the students' skills in telling time. Official time, or the 24 h clock, and the Canadian time zones are studied.
- h. Solving problems involving time and money is the focus of Lesson 10.

Hence, this unit has many practical applications. As the suggestions offered in the Lessons are used, mathematics is made more meaningful to the student.

Ideas

The theme of this unit is *Transportation*. Visit a travel agency and obtain holiday brochures and maps. Create a travel display in the classroom. Highlight the concepts of this unit in the travel information.

- a. Have the students determine distance to be travelled using map scales.
- b. Have the students determine the time a trip takes and find the time difference between two cities if travel involves a new time zone.
- c. Have the students estimate trip costs and determine the total amount of money needed.

UNIT 12

APPLICATIONS



UNIT 12 Objective	Test Questions	Pages
A50	1, 2	266-267
M15	3, 4	268-269
M16	5, 6	270-271
G10	7, 8	274-275
G11	9, 10	276-277
G12	11	278-279
M17	12-14	280-281
M18	16	282-283
PS	15	

Pretest

Unit 12

Find the average. Round to the nearest whole number.

1. 76¢, 95¢, 82¢, 67¢, 88¢ 82¢ 2. 350 km, 395 km, 310 km, 348 km

351 km

Add or subtract.

3. $\$4720.75 + \$38.50 = \underline{\$4759.25}$ 4. $\$1050 - \$495.27 = \underline{\$554.73}$

Count the change.

5. for \$6.28 from \$7.00 72¢ 6. for \$15.62 from \$20.00 \$4.38

Are the two figures similar?

7.  Yes

8.  No

Measures

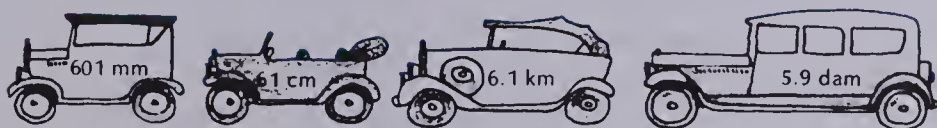
Which train will each rider board?



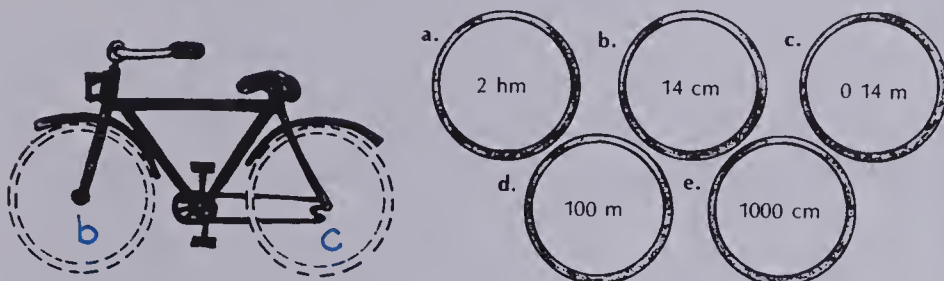
1. $<1\text{ m}$ 2. $>1\text{ m}$ 3. $<1\text{ m}$ 4. $>1\text{ m}$ 5. $>1\text{ m}$ 6. $<1\text{ m}$

How many metres?

7. 0.601 m 8. 0.61 m 9. 6100 m 10. 59 m

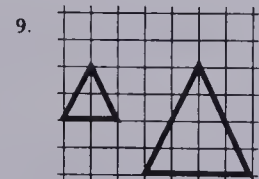


Find the pairs of wheels. Match the letter and the number of wheels that represent equal lengths.

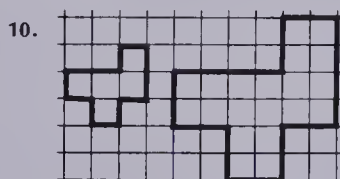


11. b 12. a 13. e 14. b, c 15. d
- 140 mm 20 dam 1 dam 1.4 dm 1000 dm

265



Yes



Yes

11. On 1 cm grid paper, make an enlargement of the figure so that its dimensions are twice as large.



Add or subtract.

12. $12\text{ h } 45\text{ min}$
 $+ 2\text{ h } 50\text{ min}$
 $15\text{ h } 35\text{ min}$

13. $09:15$
 $- 06:20$
 $02:55$

14. $10:45$
 $- 04:15$
 $06:30$

Solve.

15. If 3 m of cord cost \$6.95, what do 9 m cost? $\$20.85$

16. If it is 03:00 in Montreal, what time is it in Calgary? $01:00$

UNIT 12

PREVIEW

Suggestions

Make a list on the chalkboard of the kinds of transportation seen on page 264. Have the students tell what kinds of information one might need to travel with each type of transportation.

car: speed, distance, time, litres of gas, cost of gas

plane: cost of ticket, distance, time, and time zones

Explain that the work of this unit will be involved with this kind of information.

About the Page

Display a metre stick. Point out the number of decimetres, centimetres, and millimetres in a metre. Record these relationships on the chalkboard. Have the students name also the relationships of metres to deca-metres, to hectometres, and to kilometres.

kilometre $1\text{ km} = 1000\text{ m}$

hectometre $1\text{ hm} = 100\text{ m}$

decametre $1\text{ dam} = 10\text{ m}$
 metre

decimetre $10\text{ dm} = 1\text{ m}$

centimetre $100\text{ cm} = 1\text{ m}$

millimetre $1000\text{ mm} = 1\text{ m}$

Record the following metric chart on the chalkboard. Use it to explain the changing of metric units of length. Point out, for example, that 2 hm is equal to 20 dam, 200 m, and 2000 dm. Show how each move to the right increases the amount 10 times, since the unit of length becomes 10 times smaller.

km	hm	dam	m	dm	cm	mm
	2	20	200	2000		

Show that, conversely, 4000 cm is equal to 400 dm, 40 m, and 4 dam. Explain that each move to the left decreases the amount 10 times since the unit of length becomes 10 times larger.

km	hm	dam	m	dm	cm	mm
		4	40	400	4000	

Once the above concepts have been reviewed, students should find no difficulty in completing page 265.

UNIT 12 LESSON 1

Objective A50

Find the average of a set of numbers.

Introducing the Lesson

Write a few statements similar to the following on the chalkboard. Use them to discuss the meaning of **average**.

Marilyn's average number of correct answers on her weekly, 25-word spelling test is 21.

Does Marilyn always have 21 correct answers? Could she ever have 18, or even, 25 correct answers? What does average mean?

Teaching the Lesson

Read and discuss the problem at the top of page 266. Point out the two steps for finding the average of a set of numbers: add and divide.

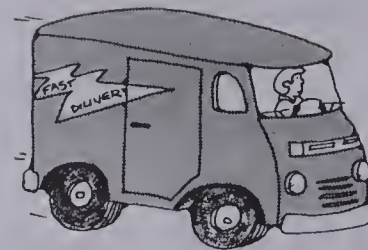
Note that the division does not come out even, so it is best to place decimal points in the dividend and quotient, add a zero in the dividend, and divide to tenths. The quotient can then be rounded to the nearest whole number. (Students have previously added zeros in the dividend in Unit 9, page 210.)

Print the first and last names of several students on the chalkboard. Ask, "What is the average number of letters in these students' names?" Have the students count the letters and then do the two arithmetical steps for finding the average. If the quotient has a remainder, tell them to add a zero to the dividend, divide to tenths, and round to the nearest whole number.

Measure the height of several students in centimetres. Record their heights on the chalkboard. Have the students calculate the average height.

Averages

George has a delivery service. Last week, he made 22 deliveries on Monday, 27 on Tuesday, 24 on Wednesday, 30 on Thursday, and 20 on Friday. About how many deliveries did he make a day? (Round to the nearest whole number.)



Step 1.

Add

$$\begin{array}{r} 22 \\ 27 \\ 24 \\ 30 \\ + 20 \\ \hline 123 \end{array}$$

Step 2.

Divide

$$\begin{array}{r} 24 \\ 5 \overline{) 123} \\ \underline{-10} \\ 23 \\ \underline{-20} \\ 3 \end{array}$$

Continue dividing

$$\begin{array}{r} 24.6 \\ 5 \overline{) 123.0} \\ \underline{-10} \\ 23 \\ \underline{-20} \\ 30 \\ \underline{-30} \\ 0 \end{array}$$

Round

25

doesn't divide evenly

He made about 25 deliveries a day. This is his **average**.

EXERCISES

Find the average.

1. $\begin{array}{r} 2 \text{ g} \\ 4 \text{ g} \\ 10 \text{ g} \\ + 8 \text{ g} \\ \hline 24 \text{ g} \end{array}$

$$24 \div 4 = 6$$

The average mass is **6 g**

2. $\begin{array}{r} 4 \text{ years} \\ 7 \text{ years} \\ 9 \text{ years} \\ 3 \text{ years} \\ + 7 \text{ years} \\ \hline 30 \end{array}$

$$30 \div 5 = 6$$

The average time is **6 years**

3. $\begin{array}{r} 67 \text{ kg} \\ 72 \text{ kg} \\ + 74 \text{ kg} \\ \hline 213 \end{array}$

$$213 \div 3 = 71$$

The average mass is **71 kg**

Find the average. Round to the nearest whole number.

4. $11, 7, 8, 16$

5. $8, 12, 15, 7, 9$

6. $21, 23, 19, 22$

7. $16, 14, 11, 10, 9, 21, 15, 18$

Using the Exercises

- Questions 1 to 3 establish the two-step routine for finding an average. Each of these divisions comes out even.
- For questions 4 to 7, the divisions do not come out even. Thus, to express the averages as whole numbers, the students should place decimal points in the dividend and in the quotient, add a zero in the dividend, and divide to tenths.

PRACTICE

Find the average. Round to the nearest whole number.

- 6, 11, 4 **7**
- 62, 81, 74, 83 **75**
- 2, 9, 4, 3, 8, 5, 4 **5**
- 14, 27, 31, 20, 18 **22**
- 16, 24, 11, 18, 19, 23 **19**
- 79, 46, 40, 63, 71 **60**
- 31, 52, 25, 44, 56, 29 **40**
- 125, 133, 214, 162, 204 **168**
- 8967, 8898 **8933**
- 10.1, 9.5, 8.3 **9**

Solve.

- A truck hauled five loads of grain. The first load had a mass of 13 t. The others were 11 t, 13 t, 16 t, and 15 t. What was the average mass of the loads? **13.6 t**
- A bus driver worked 20 days in April, 21 days in May, 22 days in June, 25 days in July, and 25 days in August. What was the average number of days worked per month? **22.6 (23)**
- Grace is learning to be a pilot, she logged the following flight times: 2.5 h, 1.75 h, 4 h, and 2.75 h. What was her average flight time? (Round to the nearest tenth.) **2.8 h**
- Find the average mass of these compact cars, to the nearest hundredth: 1.750 t, 1.973 t, 1.694 t, 2.107 t? **1.88 t**
- Four subway cars carried an average of 100 passengers each. The first three cars carried 75, 85, and 125 passengers. How many passengers did the fourth car carry? (Hint! Guess and test.) **115**

USING THE CALCULATOR

Use a calculator to find the average of each set of numbers. Round to the nearest hundredth.

- 1073, 4180, 917 **2056.67**
- 41.97, 27.32, 31.07, 4.3, 52.107 **31.35**
- 17, 28, 14, 10, 41, 22, 35 **23.86**
- 0.342, 0.648, 0.356 **0.45**
- 8, 2, 1, 4, 3, 8, 2, 3 **3.88**
- 13, 19, 21, 27 **20.00**

267

Assigning the Practice

Minimum: 1–12
Average: 4–15
Enriched: 4–15

Reinforcement

- Assign *Using the Calculator* at the bottom of page 267.
- Use data from various school activities or about the students for finding the average.
 - Keep track of your class's attendance for one week. Have the students compute the average attendance for that week.
 - List the number of students in each classroom. Have the students compute the average class size.
 - List distances jumped or points scored in gym class. Find average distances jumped or points scored.
 - Measure and record hand and arm spans. Have the students compute the averages.

Enrichment

- Ask the students to supply the missing numbers.
 - The average of 46 and ■ is 47.
 - The average of 45, 49, and ■ is 46.
 - The average of 54, 43, 47, 45, and ■ is 45.
- Have the students survey the times fellow classmates go to bed and get up in the morning. Then ask them to compute the average times.

Extra Practice

Worksheet A50

Pages 266–267

Find the average price.

Round to the nearest cent.

Item	Sam's Supermarket	Gebauer's Groceries	Schmidt's Delicatessen	Average Price
2 L milk	\$2.49	\$2.69	\$2.85	\$2.68
Apples	\$0.69/kg	\$0.65/kg	\$0.88/kg	\$0.74
Sausage	\$5.25/kg	\$5.26/kg	\$4.95/kg	\$5.15
Detergent	\$1.19	\$1.27	\$1.35	\$1.27
Yogurt	\$1.55	\$1.58	\$1.49	\$1.54
Chocolate	\$1.15	\$1.35	\$1.39	\$1.30

Objective M15

Add and subtract money.

Introducing the Lesson

Have the students record the following amounts of money in dollars and cents.

- thirty-one dollars and sixteen cents
- five hundred five dollars and five cents
- 346¢
- 109¢

Teaching the Lesson

Review the process for adding and subtracting money as you read and discuss the lesson example at the top of page 268. Note the regrouping steps and positions of the dollar signs and cents points.

Show the students a monthly chequing account statement. Discuss its purpose. Point out how one matches the figures in the statement to those recorded in one's cheque book.

Give the students a worksheet like the following (which is similar to a cheque book). Point out the cheques, deposits, and beginning balance for the month of May. Have the students compute and record the balance after each cheque or deposit and find the end-of-the-month balance.

Date	Amount of Cheque	Amount of Deposit	Balance \$150.25
May 1	\$27.48		
May 4	\$35.62		
May 10	\$ 8.05		
May 14		\$50.00	
May 21	\$48.00		
May 28		\$50.00	
May 30	\$72.95		

The monthly statement from the bank for this account states that the ending balance should be \$110.17. Find the error.

Date	Amount of Cheque	Amount of Deposit	Balance \$ 42.80
May 3	\$35.42		7.48
May 10		\$ 75.00	82.48
May 19		\$120.00	202.48
May 21	\$87.95		114.53
May 30	\$ 4.26		110.27

Adding and Subtracting Money

Clare wanted to visit her cousin. She had \$8.48. Her father gave her \$10.75 more. How much money did she have then?

$$\begin{array}{r} \$8.48 \\ + 10.75 \\ \hline \end{array}$$

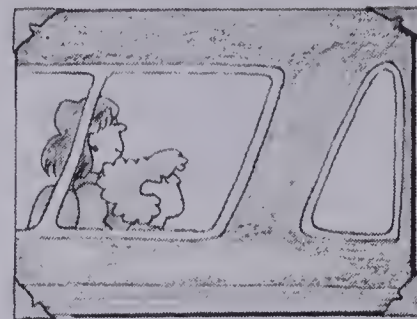
Clare had \$19.23

The bus fare to her cousin's home was \$9.85. How much money did Clare have left?

$$\begin{array}{r} \$19.23 \\ - 9.85 \\ \hline \end{array}$$

Clare had \$9.38 left.

To add or subtract money, align the decimal points.



EXERCISE

Write the amount using \$.

- three dollars and thirty-six cents **\$3.36**
- seventy dollars and seventy cents **\$70.70**
- eighty-one dollars and three cents **\$81.03**
- forty dollars and four cents **\$40.04**
- one hundred twenty-five dollars and ten cents **\$125.10**

Add or subtract.

- | | | | |
|--|--|---|---|
| 6. $\begin{array}{r} \$0.31 \\ + 0.08 \\ \hline \end{array}$ | 7. $\begin{array}{r} \$7.49 \\ - 2.15 \\ \hline \end{array}$ | 8. $\begin{array}{r} \$16.43 \\ + 0.94 \\ \hline \end{array}$ | 9. $\begin{array}{r} \$43.17 \\ - 8.32 \\ \hline \end{array}$ |
| \$0.39 | \$5.34 | \$17.37 | \$34.85 |
| 10. $\begin{array}{r} \$0.42 + \$1.17 \end{array}$ | \$1.59 | 11. $\begin{array}{r} \$27.05 + \$8.23 \end{array}$ | \$35.28 |
| 12. $\begin{array}{r} \$5.73 - \$2.21 \end{array}$ | \$3.52 | 13. $\begin{array}{r} \$14.09 - \$9.32 \end{array}$ | \$4.77 |

Using the Exercises

- Questions 1 to 5 provide practice in writing amounts of money using the dollar sign and cents point.
- For questions 6 to 13, students must watch the signs as they add or subtract.

PRACTICE

Add or subtract.

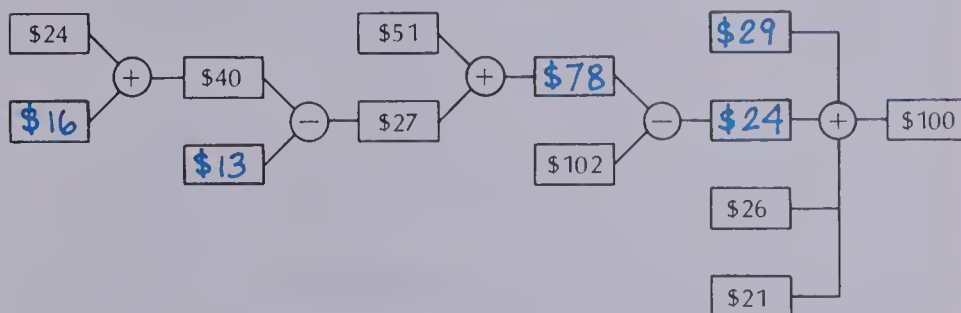
1. $\begin{array}{r} \$0.34 \\ + 0.54 \\ \hline \$0.88 \end{array}$
2. $\begin{array}{r} \$1.74 \\ + 2.25 \\ \hline \$3.99 \end{array}$
3. $\begin{array}{r} \$24.35 \\ + 13.53 \\ \hline \$37.88 \end{array}$
4. $\begin{array}{r} \$243.50 \\ 76.95 \\ + 12.04 \\ \hline \$332.49 \end{array}$
5. $\$62.07 + \$8.97 = \$71.04$
6. $\$391.20 + \$8.08 = \$399.28$
7. $\begin{array}{r} \$0.78 \\ - 0.23 \\ \hline \$0.55 \end{array}$
8. $\begin{array}{r} \$2.74 \\ - 1.29 \\ \hline \$1.45 \end{array}$
9. $\begin{array}{r} \$14.62 \\ - 5.74 \\ \hline \$8.88 \end{array}$
10. $\begin{array}{r} \$48.00 \\ - 6.75 \\ \hline \$41.25 \end{array}$
11. $\$24.30 - \$0.91 = \$23.39$
12. $\$79.50 - \$3.64 = \$75.86$

Solve.

13. To ride the city bus, it costs Mr. Pulsen 75¢, Mrs. Pulsen 75¢, Sonja 25¢, Gerrard 25¢, and Paul 50¢. What does it cost for the whole family to ride the bus? $\$2.50$
14. The regular air fare from Jane's home to Niagara Falls is \$278.50. The supersaver fare is \$198.99. How much is saved by taking the supersaver fare? $\$79.51$
15. Luis' father had these travel expenses: taxi \$7.85, air fare \$187.32, taxi \$4.35, hotel \$75. What was his total travel expense? $\$274.52$

Math Hopscotch

Find the missing numbers.



269

Extra Practice

Worksheet M15

Pages 268-269

Find the balance after each cheque and deposit is entered.

Date	Amount of Cheque	Amount of Deposit	Balance
			\$16.45
June 2	\$ 9.40		\$ 7.05
June 5		\$28.50	\$35.55
June 12	\$15.25		\$20.30
June 15	\$20.09		\$0.21
June 19		\$95.00	\$ 95.21
June 24	\$62.45		\$32.76
June 25		\$54.28	\$87.04
June 29	\$50.25		\$36.79

Assigning the Practice

Minimum: 1-10, 13

Average: 5-15

Enriched: 5-15

Reinforcement

1. Assign *Math Hopscotch* at the bottom of page 269.

2. Make up a set of cards with amounts of money to be used in a game for two players. The cards are turned face down on the table, a player spins the spinner, and then draws two cards. The amounts on the cards are added or subtracted according to what was spun. Correct responses receive one point. When the drawing pile is exhausted, the player with the most points wins.

3. Have the students find the missing numbers.

$$\begin{array}{r} \text{a. } \$0.38 \\ 0.47 \\ \hline \end{array}$$

$$\begin{array}{r} + 0.61 \\ \hline \$1.98 \end{array}$$

$$\begin{array}{r} \text{b. } \$ 1.78 \\ 4.53 \\ \hline + 7.52 \\ \hline \$16.18 \end{array}$$

$$\begin{array}{r} \text{c. } \$ 34.51 \\ 43.56 \\ 52.31 \\ \hline + \quad \blacksquare \\ \hline \$140.43 \end{array}$$

$$\begin{array}{r} \text{d. } \$ 3.00 \\ 25.06 \\ \hline + 4.85 \\ \hline \$33.69 \end{array}$$

Enrichment

1. Provide the students with blank worksheets like those used in the lesson. Ask them to fill in dates, cheques, deposits, and a beginning balance. Then these can be exchanged and the ending balance computed. Calculators can be used.

2. Obtain blank, unnumbered cheques from a local bank. Show the students how to write a cheque properly.

UNIT 12 LESSON 3

Objective M16

Count change up to \$20.00

Introducing the Lesson

Set up a small "store" in the classroom. Have the students help you display various items and attach price tags to them. Keep all prices under \$20.00.

Also prepare a "cash register" by putting out various coins and bills to \$20.00.

Teaching the Lesson

Ask a few students, one at a time, to select an item and pay for it (with either a \$1, \$2, \$5, \$10, or \$20 bill). As cashier, show them how the change is counted out. For example, a \$3.65 book is paid for with \$5.00. \$3.65, \$3.75 (give a dime), \$4.00 (give a quarter), and \$5.00 (give a dollar). Explain that one counts the change from the price of the item to the amount of money given.

Now have various students take turns being cashier and counting out the change. Record each time the change is counted on the chalkboard.

\$15.35 — a dime
15.45 — a nickel
15.50 — a quarter
15.75 — a quarter
16.00 — a \$2 bill
18.00 — a \$2 bill
20.00

After a few examples, have a student record change and count on the chalkboard.

Ask each student who bought an item to record the related subtraction on the chalkboard to see if the change is correct.

\$ 7.89 — a penny
7.90 — a dime
8.00 — a \$2 bill
10.00

$$\begin{array}{r} 9910 \\ \$10.00 \\ - 7.89 \\ \hline \$ 2.11 \end{array}$$

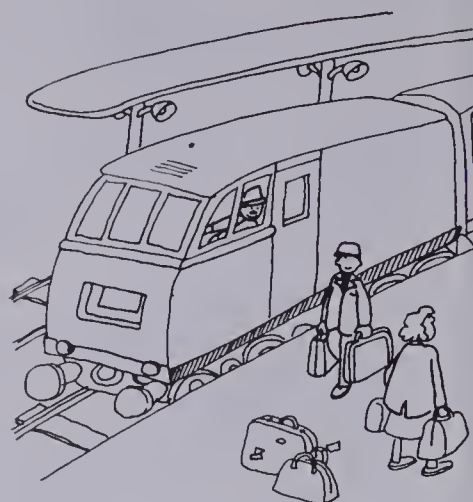
Making Change

Giles is travelling to Swift Current. He gave the clerk a \$20 bill. What change did the clerk give him?

Fares	
Brandon	\$17.45
Moose Jaw	\$3.80
Swift Current	\$13.55

Start from the cost of the ticket.
Count by coins and bills to \$20.00.

- \$13.55 What coin was added?
- 13.65 What coin was added?
- 13.75 What coin was added?
- 14.00 What bill was added?
- 15.00 What bill was added?
- 20.00



The clerk gave him 2 dimes, a quarter, a \$1 bill, and a \$5 bill.

EXERCISES

Count the change for this amount from \$1.00.

1. 98¢ **2¢** 2. 37¢ **63¢** 3. 19¢ **81¢** 4. 67¢ **33¢**

Count the change for this amount from \$5.00.

5. \$1.74 **\$3.26** 6. \$2.31 **\$2.69** 7. \$3.93 **\$1.07** 8. \$4.07 **\$0.93**

Count the change for this amount from \$10.00.

9. \$5.50 **\$4.50** 10. \$4.75 **\$5.25** 11. \$3.89 **\$6.11** 12. \$8.24 **\$1.76**

Count the change for this amount from \$20.00.

13. \$18.98 **\$1.02** 14. \$12.35 **\$7.65** 15. \$14.75 **\$5.25** 16. \$15.78 **\$4.22**
17. \$9.95 **\$10.05** 18. \$10.50 **\$9.50** 19. \$7.40 **\$12.60** 20. \$11.89 **\$8.11**
21. \$4.85 **\$15.15** 22. \$3.49 **\$16.51** 23. \$2.73 **\$17.27** 24. \$6.44 **\$13.56**

Using the Exercises

- Questions 1 to 4 require the students to count the change for items paid with a \$1 bill, e.g.: 37¢, 40¢, 50¢, 75¢, \$1.00.
- Questions 5 to 8 involve counting change for items paid with a \$5 bill.
- Questions 9 to 12 involve counting change for items paid with a \$10 bill.
- Questions 13 to 24 require the students to count the change for items paid with a \$20 bill.
Note: suggest the students use the largest coins and bills possible when making change.

PRACTICE

Subtract.

- | | | | |
|---|--|---|---|
| 1. $\begin{array}{r} \$1.00 \\ - 0.25 \\ \hline \$0.75 \end{array}$ | 2. $\begin{array}{r} \$1.00 \\ - 0.28 \\ \hline \$0.72 \end{array}$ | 3. $\begin{array}{r} \$2.00 \\ - 0.43 \\ \hline \$1.57 \end{array}$ | 4. $\begin{array}{r} \$2.00 \\ - 1.27 \\ \hline \$0.73 \end{array}$ |
| 5. $\begin{array}{r} \$5.00 \\ - 3.78 \\ \hline \$1.22 \end{array}$ | 6. $\begin{array}{r} \$10.00 \\ - 4.75 \\ \hline \$5.25 \end{array}$ | 7. $\begin{array}{r} \$20.00 \\ - 6.62 \\ \hline \$13.38 \end{array}$ | 8. $\begin{array}{r} \$20.00 \\ - 10.40 \\ \hline \$9.60 \end{array}$ |

Count the change for this amount from \$5.00.

- | | | | |
|--|---|---|---|
| 9. $\begin{array}{r} \$1.50 \\ \$3.50 \end{array}$ | 10. $\begin{array}{r} \$0.30 \\ \$4.70 \end{array}$ | 11. $\begin{array}{r} \$2.70 \\ \$2.30 \end{array}$ | 12. $\begin{array}{r} \$3.60 \\ \$1.40 \end{array}$ |
|--|---|---|---|

Count the change for this amount from \$10.00.

- | | | | |
|---|---|---|---|
| 13. $\begin{array}{r} \$4.00 \\ \$6.00 \end{array}$ | 14. $\begin{array}{r} \$3.38 \\ \$6.62 \end{array}$ | 15. $\begin{array}{r} \$1.95 \\ \$8.05 \end{array}$ | 16. $\begin{array}{r} \$7.45 \\ \$2.55 \end{array}$ |
|---|---|---|---|

Count the change for this amount from \$20.00

- | | | | |
|--|--|--|--|
| 17. $\begin{array}{r} \$14.98 \\ \$5.02 \end{array}$ | 18. $\begin{array}{r} \$10.75 \\ \$9.25 \end{array}$ | 19. $\begin{array}{r} \$8.90 \\ \$11.10 \end{array}$ | 20. $\begin{array}{r} \$12.82 \\ \$7.18 \end{array}$ |
| 21. $\begin{array}{r} \$3.50 \\ \$16.50 \end{array}$ | 22. $\begin{array}{r} \$2.99 \\ \$17.01 \end{array}$ | 23. $\begin{array}{r} \$1.49 \\ \$18.51 \end{array}$ | 24. $\begin{array}{r} \$5.14 \\ \$14.86 \end{array}$ |

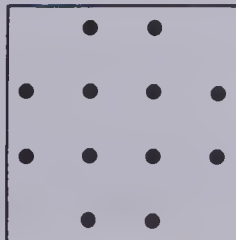
Solve.

25. A taxi fare was \$6.35. The passenger gave the driver a \$20.00 bill. How much change was given? **\$13.65**
26. A commuter train ticket from Oakville to Toronto costs \$7.59. How much change should a passenger get from \$10? **\$2.41**
27. Peter had \$20.00 with him for a boat cruise. The ticket cost \$12.80. Refreshments cost \$3.85. Did he have enough change left to buy a \$4.00 souvenir? **No**

Squares

How many different squares can be drawn by joining these dots? **9**

There are more than five!



271

Assigning the Practice

Minimum: 1-20, 25

Average: 5-27

Enriched: 5-27

Reinforcement

1. Cut out items and their prices from catalogs and attach them to cards. Give each student several \$5, \$10, and \$20 bills and rubber coin stamps. Show one (or more than one) card at a time as a purchase. Have the students show you a bill (\$5, \$10, or \$20) which they could use for purchase and then use rubber coin stamps to show the change.

2. Discuss how some stores have cash registers which tell the cashier how much change to give. Bring in some cash register receipts from stores like this and point out the figures shown on them.

3. Ask the students to name the coins as the following change is counted.

- \$3.19, \$3.20, \$3.25, \$3.50, \$3.75, \$4.00, \$5.00
- \$0.32, \$0.33, \$0.34, \$0.35, \$0.40, \$0.50, \$0.75, \$1.00
- \$14.83, \$14.84, \$14.85, \$14.95, \$15.00

Enrichment

1. Assign *Squares* at the bottom of page 271.

2. Have the students study the following menu and then answer the questions.

MENU	
Milkshake	\$1.25
Fries	\$0.75
Apple Pie	\$0.95
Hamburger	\$1.95
Milk	\$0.55

a. Mark ordered from the menu. He received \$5.10 change from \$10.00. What did he have for lunch? (He did not have two of any item.)

b. Mary also ordered from the menu. She received \$1.55 change from \$5.00. What did she have for lunch? (She did not have two of any item.)

Extra Practice

Worksheet M16

Pages 270-271

Count the change for this amount from \$5.00.

- | | | |
|--|--|--|
| 1. $\begin{array}{r} \$4.74 \\ \$0.26 \end{array}$ | 2. $\begin{array}{r} \$2.98 \\ \$2.02 \end{array}$ | 3. $\begin{array}{r} \$0.79 \\ \$4.21 \end{array}$ |
|--|--|--|

Count the change for this amount from \$20.00.

- | | | |
|---|---|---|
| 4. $\begin{array}{r} \$15.97 \\ \$4.03 \end{array}$ | 5. $\begin{array}{r} \$9.90 \\ \$10.10 \end{array}$ | 6. $\begin{array}{r} \$3.85 \\ \$16.15 \end{array}$ |
|---|---|---|

Subtract.

- | | | | |
|---|---|--|--|
| 7. $\begin{array}{r} \$1.00 \\ - 0.14 \\ \hline \$0.86 \end{array}$ | 8. $\begin{array}{r} \$5.00 \\ - 4.05 \\ \hline \$0.95 \end{array}$ | 9. $\begin{array}{r} \$10.00 \\ - 4.91 \\ \hline \$5.09 \end{array}$ | 10. $\begin{array}{r} \$20.00 \\ - 14.62 \\ \hline \$5.38 \end{array}$ |
|---|---|--|--|

11. Dorothy gave the cashier \$5.00 to pay for a ferry boat ticket which costs \$2.75. How much change did she receive? **\$2.25**

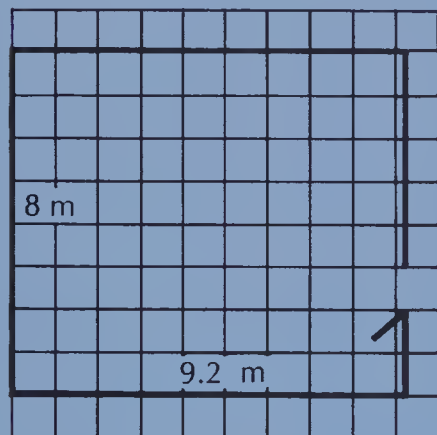
Objective PS11

Estimate answers in solving measurement problems.

Introducing the Lesson

Give each student the following floor plan. "About how many square metres of carpet would be needed to cover this room wall to wall?"

Discuss the students' strategies for estimating the amount. Point out that since squares are not always available to count, a good way to get an estimated answer is to *round* each length to the nearest whole number and then multiply.



$$\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \text{ m}^2 \end{array}$$

About 72 m² are needed.

Have the students point out repair, building, sewing, or other projects in which a *measurement estimate* is needed before the supplies are purchased.

Teaching the Lesson

Read and discuss the problem at the top of page 272. Point out that people often use a rounded number when telling about the distance they have travelled. Note the two strategies for rounding given in the example. Which strategy would be closer to the actual amount of kilometres?

Provide the students with metre sticks. Have them estimate the number of square metres needed to carpet the classroom wall to wall.

Have the students estimate the solution to this measurement situation. "Would \$3.15 be enough money to pay for 0.5 kg of cheese at \$6.19/kg?"

Half of \$6.20 is \$3.10.

Measurement in Problem Solving



A family drove 462.5 km on the first day of their holidays, 314.8 km on the second day, and 578.7 km on the third day. How far did they drive in three days? $\begin{array}{r} 462.5 \\ 314.8 \\ + 578.7 \\ \hline \end{array}$



I'll round to the nearest hundred.
 $500 + 300 + 600 = 1400$
 The answer should be about 1400 km



I'll round to the nearest 50.
 $\begin{array}{r} 450 \\ 300 \\ + 600 \\ \hline 1350 \end{array}$

The correct answer should be near 1400 or 1350 km.

EXERCISES

Choose the most likely answer.

- A rectangular field is 348.3 m long and 238.6 m wide. What is the perimeter of the field?
 a. 117.38 m b. 1173.8 m c. 3104.38 m d. 11.78 m
- The floor of a room is rectangular and is 11.2 m long and 7.7 m wide. How much carpet is needed to cover the floor?
 a. 862.4 m² b. 8624 m² c. 86.24 m² d. 8.624 m²
- A board was cut into three pieces. The pieces were 0.9 m, 1.65 m, and 1.23 m long. How long was the original board?
 a. 37.8 m b. 0.0378 m c. 3.78 m d. 378 m
- The inside of a van is 2.3 m wide, 3.8 m long, and 2 m high. What is its volume?
 a. 17.48 m³ b. 1.748 m³ c. 8.1 m³ d. 1748 m³
- A piece of ribbon was 39.5 cm long. Cynthia cut off a length 21.75 cm long. How much was left?
 a. 17.75 cm b. 75 cm c. 7.75 cm d. 177.5 cm

Using the Exercises

- Questions 1 to 5 require the students to estimate length, perimeter, area, or volume as they choose the most likely answer. Although one answer of the four is correct, the students need only round and estimate. The estimate enables them to choose the correct answer without computing it. For example, number 4:

Estimate	Most likely answer
$2 \times 4 \times 2 = 16$	a. 17.48 m ³

PRACTICE

Choose the most likely answer.

- Sharon's temperature was 37.5°C in the morning. By evening, it was 39.2°C . By how much did her temperature rise?
a. 75.7°C b. 1.7°C c. 2.7°C d. 17°C
- In a chemical experiment, the mass of a sample was measured three times. The results were 2 68 mg, 2 69 mg, and 2 64 mg. What was the average mass of the sample?
a. 267 mg b. 8.01 mg c. 26.7 mg d. 2.67 mg
- Mr. Solheim has a 1 L bottle of spot remover. How many 40 mL bottles can he fill with it?
a. 960 b. 39 c. 25 d. 250
- An arena has an ice surface that is 63 m long and 32 m wide. How many square metres of ice surface are there?
a. 95 m^2 b. 31 m^2 c. 2016 m^2 d. 1.9 m^2

REVIEW

- A50** Find the average. Round to the nearest whole number.
1. 10, 12, 9, 13, 16 12 2. 58, 40, 34, 62 49
- M15** Add or subtract.
3. $\begin{array}{r} \$14.57 \\ + 3.24 \\ \hline \$17.81 \end{array}$ 4. $\begin{array}{r} \$10.04 \\ - 3.58 \\ \hline \$6.46 \end{array}$ 5. $\$112.30 + \6.25
 $\$118.55$
- M16** Count the change.
6. for $\$7.90$ from $\$20.00$ $\$12.10$ 7. for $\$14.70$ from $\$20.00$ $\$5.30$
- PS11** Solve.
8. In three days, Mr. Capps drove 215 km, 486 km, and 425 km. Which total seems likely? 2126 km, 1126 km , 1026 km

273

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-2	A50	266-267
3-5	M15	268-269
6-7	M16	270-271
8	PS11	272-273

Reinforcement

1. Have the students bring in price labels from meats and produce. Cover the total price and attach these to cards. Have the students estimate the total cost which is covered by rounding the unit price and the mass. (If labels from several stores are used, the students can do some comparisons and determine better buys.)

SWEET PEPPERS

Unit Price	Total Price	Mass
$\$1.98/\text{kg}$		1.2 kg

$\$2 \times 1$ is $\$2$.

$\$1.98$ is about $\$2$.

2. Give the students highway maps of Canada. Have them plan driving trips between three or four cities and then estimate the total distance to be travelled for each trip.

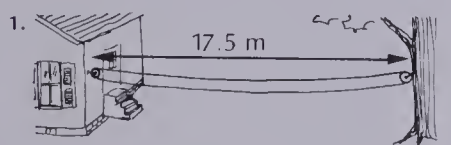
Enrichment

1. Have the students measure several areas or rooms in the school and then estimate the number of square metres required to carpet these places wall to wall.

2. Ask the students to estimate the amount of time they spend each week watching TV, reading, doing chores, sleeping, and travelling from one place to another.

Extra Practice

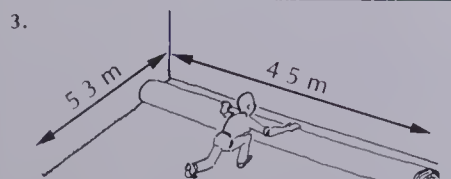
Estimate.



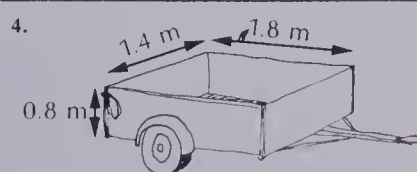
About how much line is needed for this 2-pulley clothes line? 35 m



One litre of paint covers about 12.5 m^2 of surface. Will that be about enough for this wall? Yes



About how many square metres of carpet are needed to completely cover this floor? 23.85



Would 3 m^3 of soil fit into this trailer? Yes

Worksheet PS11

Pages 272-273

Objective G10

Identify figures that are similar.

Introducing the Lesson

Give pairs of students a box of attribute blocks. Ask them to find, trace, and write a description of pairs of blocks which have the *same size and shape*. Review that figures having the same shape and size are called **congruent**.

Teaching the Lesson

Read and discuss the examples at the top of page 274. Point out that the pairs of figures in the three examples have the same shape, but do not have the same size. Thus, they cannot be called congruent. Explain that these figures are **similar**.

Draw figures like the following on the chalkboard. Ask, "Which pairs of figures are similar?"



Ask the students to find pairs of similar figures among their attribute blocks. Have them trace them and write a description of them.

Similar Figures

Geoffrey's little brother looks just like him.



Geoffrey and his brother are **similar**.



The squares have the same shape but are not the same size. They are similar.



The triangles have the same shape but are not the same size. They are similar.

Similar figures have the same shape.

EXERCISES

Are the two figures similar?

1.



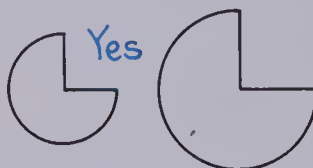
No

2.



Yes

3.



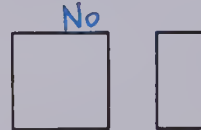
Yes

4.



Yes

5.



No

6.



Yes

7.



Yes

8.



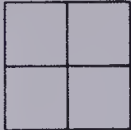

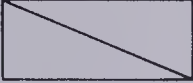
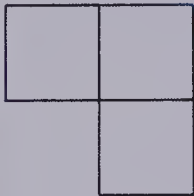
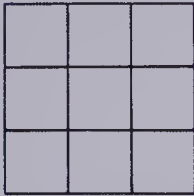
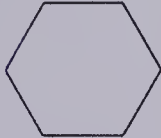

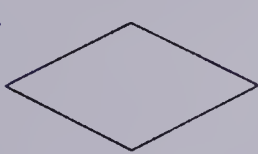
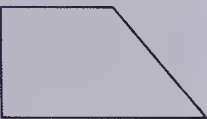
No













Using the Exercises

- Questions 1 to 8 require students to decide whether pairs of figures are similar. Ask the students to explain the reasons for their choices.

PRACTICE

Match the number and the letter of the figures that are similar.

1.  d
2.  i
3.  h
4.  a
5.  b
6.  f
7.  k, l
8.  c
9.  g

- a.  b.  c.  d.  e.  f. 
- g.  h.  i.  j.  k.  l. 

Alphabet Soup

Print the alphabet in capital letters.
Then print the alphabet in lower case letters.
Which capital letters are similar to the lower case letters?

C, O, P, S, U, V, W, X, Z

275

Assigning the Practice

Minimum: 1-9

Average: 1-9

Enriched: 1-9

Reinforcement

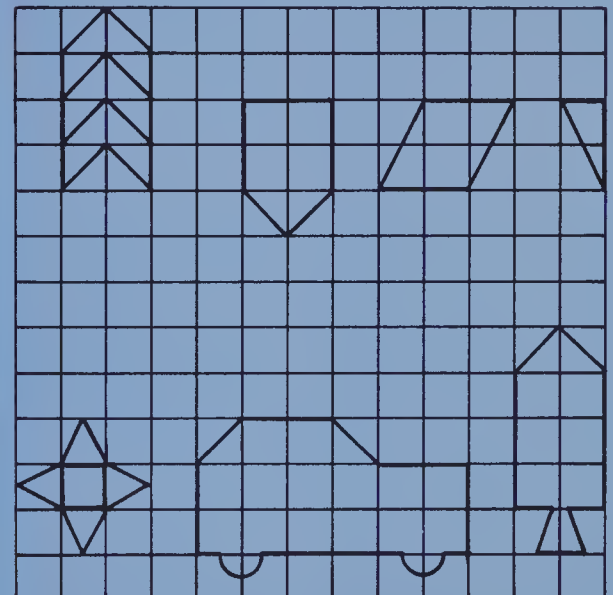
1. Assign *Alphabet Soup* at the bottom of page 275.

2. Give the students sets of cardboard polygons and protractors. Have them look for similar figures and then measure and match the corresponding congruent angles as proof of their similarity.

3. Have the students find pairs of similar objects in the classroom, at home, and in nature. Make a display of these objects.

Enrichment

Ask the students to reproduce these figures on graph paper and then make similar figures.



















Extra Practice

Worksheet G10

Pages 274-275

Match the number and the letter of the two figures that are similar.

1.  C
2.  F
3.  D
4.  E
5.  B
6.  H
7.  A
8.  G
- A.  B. 
- C.  D. 
- E.  F. 
- G.  H. 

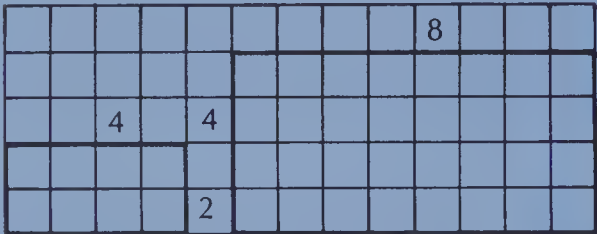
9. Name objects in the room that are similar.

Objective G11

Draw similar figures; enlarge figures.

Introducing the Lesson

Give each student a sheet of graph paper. Ask the students to make a 2 × 4 rectangle. Now have them double the length and width of the rectangle (or multiply them by 2) to make a larger rectangle. What is the new length? width? Are the figures similar?



Increase the length and width of the original rectangle three and four times to make more similar figures.

Teaching the Lesson

Point out the reasons why the above rectangles are similar.

- a. The corresponding angles are congruent (equal). All angles measure 90°.
- b. The corresponding sides are proportional.

$$\frac{\text{length}}{\text{width}} = \frac{2}{4} = \frac{4}{8} = \frac{6}{12} = \frac{8}{16}$$

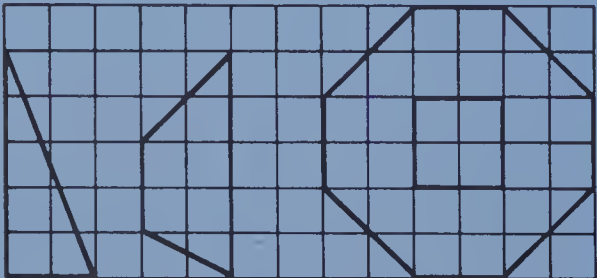
Explain, too, that the figures are enlarged proportionally each time.

Read and discuss the figures which were proportionally enlarged at the top of page 276. Point out the corresponding congruent angles and the corresponding proportional sides in each.

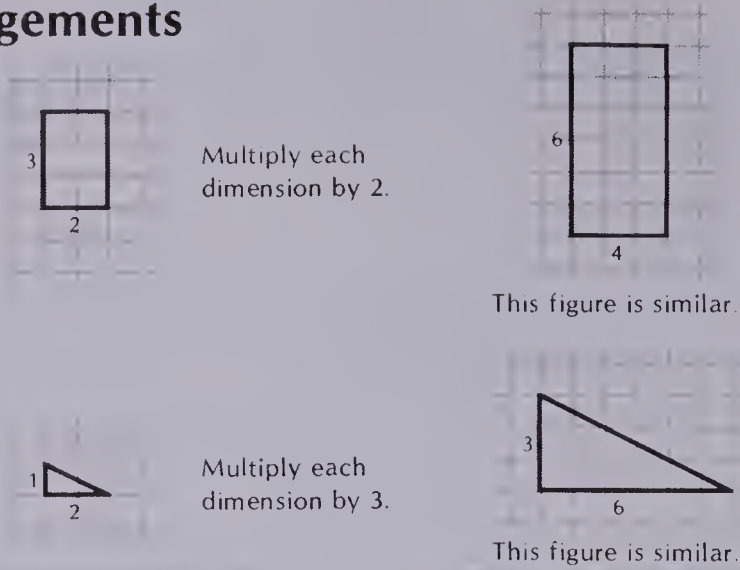
For the rectangle $\frac{\text{length}}{\text{width}} = \frac{3}{2} = \frac{3 \times 2}{2 \times 2} = \frac{6}{4}$

For the triangle $\frac{\text{base}}{\text{height}} = \frac{2}{1} = \frac{2 \times 3}{1 \times 3} = \frac{6}{3}$

Give each student a sheet of graph paper. Ask them to proportionally enlarge figures similar to the following by 2, 3, or 4 times.



Enlargements



EXERCISES

Are the two figures similar?

- 1. Yes (Two L-shaped figures, one is a 2x2 square with one corner missing, the other is a 4x4 square with one corner missing).
- 2. Yes (Two right triangles, one is a 3-4-5 triangle, the other is a 6-8-10 triangle).

Make an enlargement of the figure on grid paper.

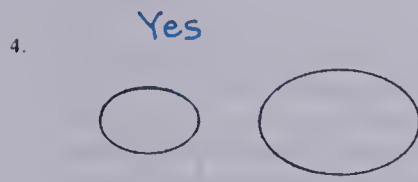
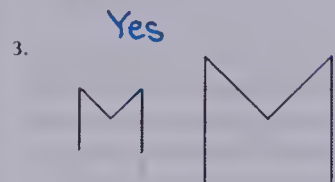
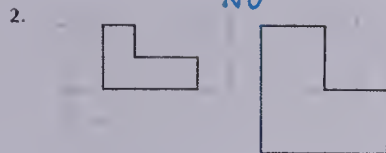
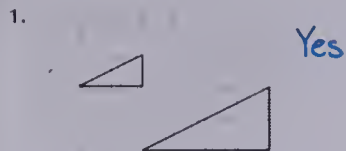
- 3. A rectangle with dimensions 3 by 2.
- 4. A complex polygon with a central square hole.
- 5. A right triangle with legs of 3 and 4.
- 6. A trapezoid with a vertical left side and a horizontal top side.

Using the Exercises

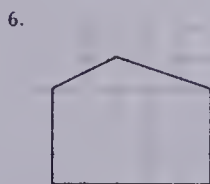
- For questions 1 and 2, the students must decide if the two figures are similar. Have them discuss the reasons for their choices. Corresponding congruent angles and corresponding proportional sides should be mentioned.
- For questions 3 to 6, ask the students first to duplicate the given figure and then to enlarge it proportionally.

PRACTICE

Are the two figures similar?

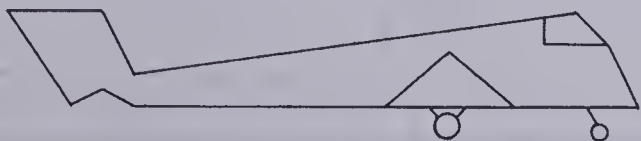
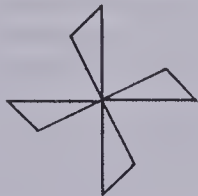


Make an enlargement of the figure on grid paper.



Bigger is Better

Make enlargements of these figures. Multiply the dimensions of the windmill by 3. Multiply the dimensions of the plane by 2.



277

Assigning the Practice

Minimum: 1-7

Average: 1-7

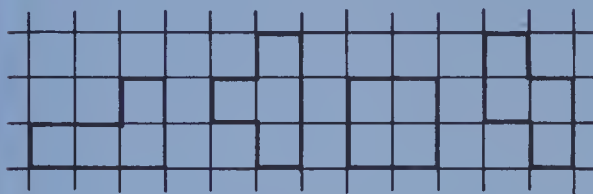
Enriched: 1-7

Reinforcement

1. Assign *Bigger is Better* at the bottom of page 277.

2. Give the students graph paper. Ask them to enlarge the following polyominoes 2, 3, and 4 times.

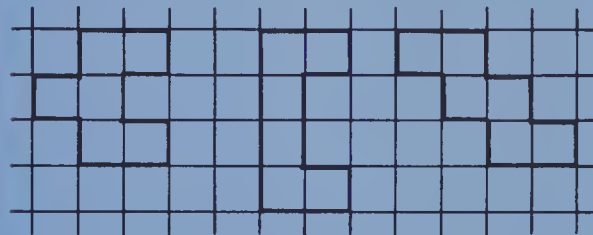
a. tetrominoes (4 squares)



b. pentominoes (5 squares)



c. hexominoes (6 squares)



Enrichment

1. Ask the students to make a 1 unit square on graph paper and then enlarge the square by 2, 3, 4, 5, and 6 times. Have them investigate the area pattern formed as they complete the table.

Enlargement of One Side	Area of Square
2 times larger	
3 times larger	
4 times larger	
5 times larger	
6 times larger	

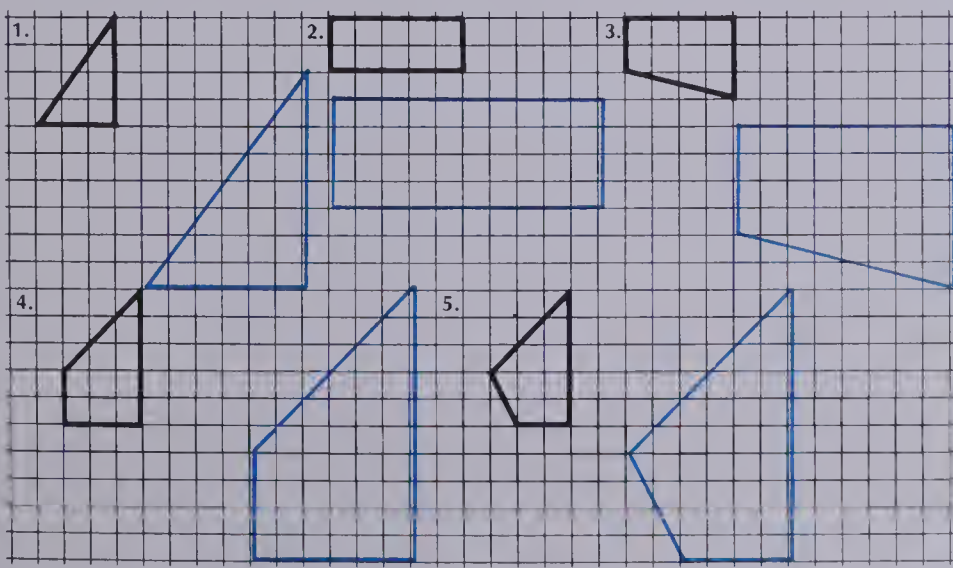
2. Have the students investigate the area patterns as several tetrominoes, pentominoes, and hexominoes are enlarged 2 or 3 times.

Extra Practice

Draw another figure similar to each and twice as large.

Worksheet G11

Pages 276-277

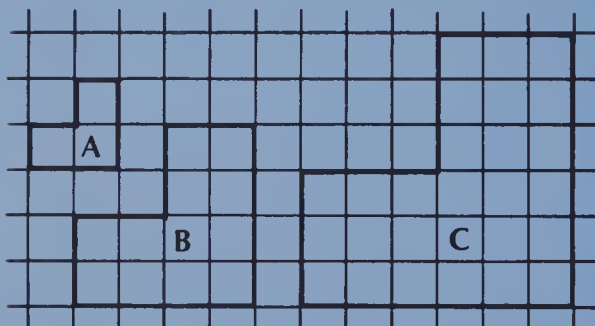


Objective G12

Interpret and make scale drawings.

Introducing the Lesson

Show the following enlargements on a centimetre grid on an overhead projector. For each, discuss how many times the figures were enlarged.



Point out that each 1 cm on figure A represents 2 cm on figure B and 3 cm on figure C. Hence, the scale for figures A and B is 1 cm = 2 cm, and the scale for figures A and C is 1 cm = 3 cm.

Teaching the Lesson

Read and discuss the scale for the enlargement on page 278. Point out the various ways it can be considered.

Show a floor plan on the overhead projector similar to the following. Point out that the scale is 1 cm = 1 m. Explain how the actual dimensions of the rooms can be determined from the scale drawing.

Scale: 1 cm = 1 m



Bedroom width on the drawing: 4 cm

Actual bedroom width: 4 m

Show a large wall map. Point out the scale. Have the students determine distances between two locations using the scale. For example, if the scale is 1 cm = 200 km and the distance on the map between two locations is 8 cm, the actual distance is 8×200 , or 1600 km.

Scale Drawings



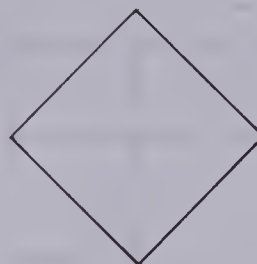
Scale: 0.5 cm = 1.0 cm

0.5 cm on the small drawing represents 1.0 cm on the large drawing.
1.0 cm on the small drawing represents 2.0 cm on the large drawing.
2.0 cm on the small drawing represents 4.0 cm on the large drawing.

EXERCISES

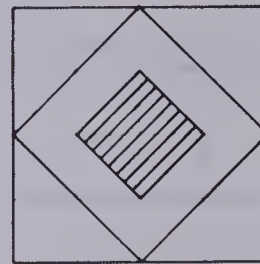
This figure is on a 2 cm grid.
Draw it on a 1 cm grid.

1.



This figure is on a 1 cm grid.
Draw it on a 0.5 cm grid.

2.



3. A map has a scale of 1 cm = 1 km. What does 3 cm on the map represent? **3 km**
4. A scale drawing of a room has a scale of 1 cm = 2 m. What does 4 cm on the drawing represent? **8 m**

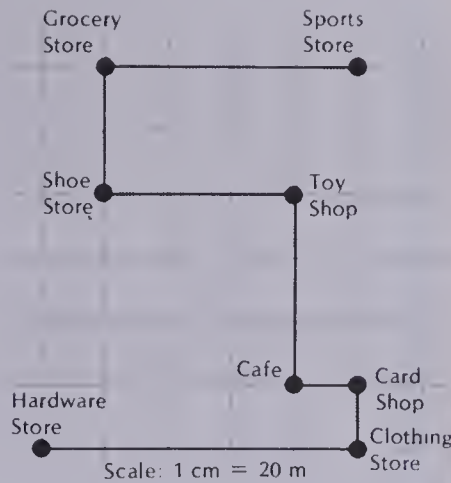
Using the Exercises

- Questions 1 and 2 require the students to make a similar, smaller figure using smaller grid paper. (Both 1 cm and 0.5 cm grid worksheets are provided with this *Teacher's Resource Book* in the Introduction to Unit 8.) Discuss the scales for each (question 1 : 2 cm = 1 cm, question 2 : 1 cm = 0.5 cm).
- For questions 3 and 4, the students must use the given scales to determine actual lengths.

PRACTICE

Follow the path shown on the map of the shopping centre. Use the scale to find the actual distance.

- from the shoe store to the toy shop **60 m**
- from the sports store to the grocery store **80 m**
- from the grocery store to the toy shop **100 m**
- from the toy shop to the clothing store **100 m**
- from the shoe store to the hardware store **260 m**



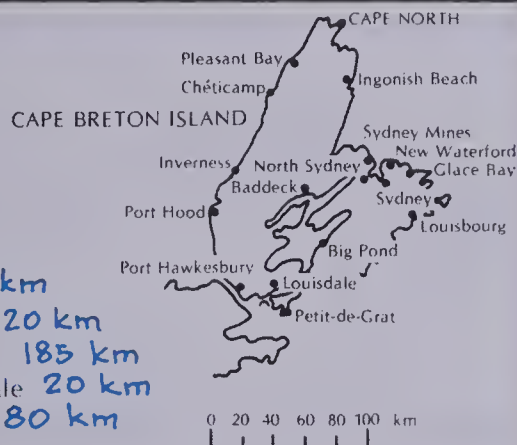
Complete.

	Scale	Length on Drawing	Real Length
6.	1 cm = 2 m	3 cm	6 m
7.	1 cm = 3 m	2 cm	6 m
8.	1 cm = 5 m	2 cm	10 m
9.	1 cm = 4 m	4 cm	16 m

Cape Breton Island

Sometimes the scale on a map is given by a line divided into sections. Use the line to find the distance between these points.

- Sydney and Glace Bay **20 km**
- Port Hood and Louisbourg **120 km**
- Cape North and Petit-de-Grat **185 km**
- Port Hawkesbury and Louisdale **20 km**
- Inverness and North Sydney **80 km**



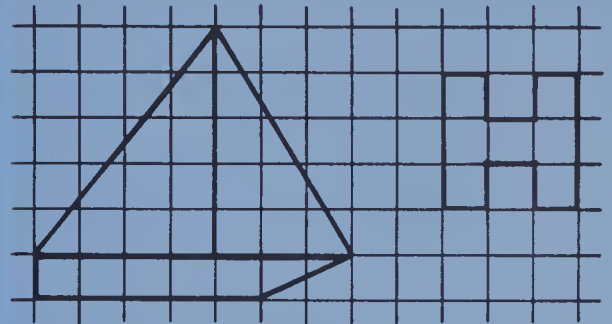
279

Assigning the Practice

Minimum: 1-9
Average: 1-9
Enriched: 1-9

Reinforcement

- Assign Cape Breton Island at the bottom of page 279.
- Give the students grid paper and rulers. Ask them to enlarge the following drawings to the given scale.



Scale: 1 cm = 6 cm Scale: 1 cm = 3 cm

- Provide maps of various places to small groups of students. Prepare a list of questions about actual distances between cities to accompany each map. Have the students measure the distances with a ruler and use the map scale to answer the questions.

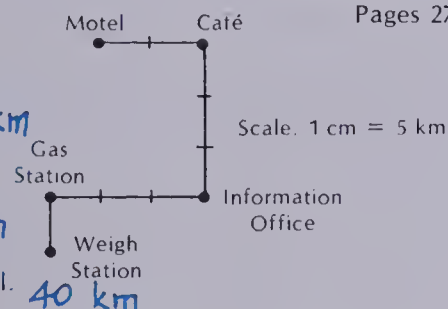
Enrichment

Ask the students to measure the actual dimensions of the classroom and/or their home. Then have them make scale drawings of these places. Display their work.

Extra Practice

On the map, 1 cm = 5 km. Find the distance along the truck route:

- from the weigh station to the gas station. **5 km**
- from the gas station to the Information Office. **15 km**
- from the gas station to the motel. **40 km**



Complete.

	Scale	Length on Drawing	Real Length
4.	1 cm = 2 km	2 cm	4 km
5.	1 cm = 3 km	5 cm	15 km
6.	1 cm = 5 km	3 cm	15 km

Worksheet G12

Pages 278-279

Objective M17

Read timetables.

Introducing the Lesson

Discuss the various instruments for telling time that have been devised from past to present (sundials, pendulum clocks, electric clocks, digital clocks, and so on). Note the reasons why telling time accurately is important today. Focus particularly on why public transportation (planes, trains, buses) need accurate instruments for telling time.

Teaching the Lesson

Review telling time briefly on a 12 h clock before introducing the 24 h clock illustrated on page 280. Point out that the 24 h clock is used on airplane and train timetables. Many countries use the 24 h clock to more clearly represent official times, important events of the day, theatre times, etc.

Note the bus timetable on page 280. Point out that no "A.M." or "P.M." is needed when writing times with the 24 h clock. Also discuss the various abbreviations used in the timetable. Relate the departure and arrival times in the schedule to 12 h clock times with questions such as: "At what time does the 13:00 train arrive in Regina on a 12 h clock?"

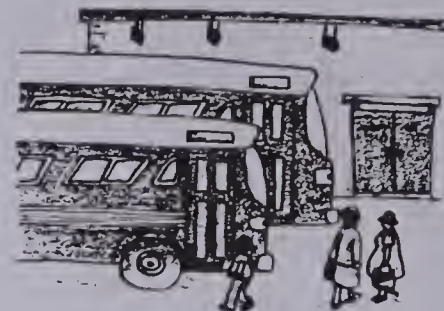
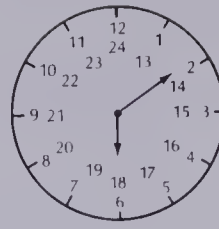
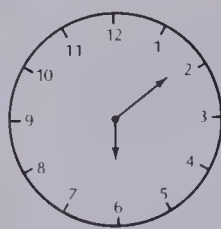
Have the students name the times for doing various daily activities. List these on the chalkboard using the 12 h clock. Then ask the students to rewrite them using the 24 h clock. Note that 12 h times need A.M. and P.M., while 24 h times do not. Note also that 24 h times must have 4 digits. For example, breakfast is eaten at 7:30 A.M. or 07:30.

Use the activity list to ask questions about how much time there is between different activities. Show the students how the answers can be obtained by subtracting. Note that if regrouping is necessary, 1 h is traded for 60 min.

04 103

$$\begin{array}{r} 05:43 \\ - 02:52 \\ \hline 2:51 \end{array}$$

Timetables



Bus Schedule

Lv. Calgary	Arr. Regina
06:00	14:00 — Daily ex Sat. & Sun
07:30	15:30 — Daily ex Sat. & Sun
09:25	19:25 — Daily
11:45	20:45 — Daily ex Sat & Sun.
13:00	21:00 — Daily
15:45	24:00 — Sat. only
17:00	01:00 — Daily ex Sat & Sun
19:50	02:50 — Daily ex Sun
21:40	05:40 — Sun only

KEY

Lv. — Leave
 Arr. — Arrive
 Daily — Every day
 ex — except
 & — and

EXERCISES

Use the bus schedule to answer the question.

- Which buses run on weekdays only? **6:00, 7:30, 11:45, 17:00**
- Which buses run on Saturday? **9:25, 13:00, 15:45, 19:50**
- Which buses run on Sunday? **9:25, 13:00, 21:40**
- Which buses leave in the morning? **6:00, 7:30, 9:25, 11:45**
- Which buses leave on Saturday afternoon? **13:00, 15:45, 19:50**
- How long does it take the 06:00 bus to travel from Calgary to Regina? **8h**
- Do all the buses take the same amount of time? **No**
- What is the latest bus you can take to Regina before midnight? **21:40**

Subtract.

9. 8 h 45 min	10. 08:45	11. 14 75	12. 09:05
— 2 h 30 min	— 02:30	— 03:30	— 01:50
6h 15 min	06:15	11:45	07:15

Using the Exercises

- Questions 1 to 8 require the students to understand the 24 h clock as they interpret the bus schedule.
- Questions 9 to 12 involve finding the difference between two times. Remind the students that if regrouping is needed, 1 h is traded for 60 min.

PRACTICE

Use the bus schedule on page 280 to answer the question.

- What time does the last bus in the morning leave for Regina?
11:45
- What time does the 17:00 bus arrive in Regina?
01:00
- What time does the first bus in the afternoon leave Calgary?
13:00

Subtract.

- | | | | |
|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|
| 4. 19:00
- 07:00
12:00 | 5. 12:00
- 04:30
07:30 | 6. 21:00
- 08:00
13:00 | 7. 09:50
- 03:20
06:30 |
| 8. 09:45
- 02:28
7:17 | 9. 12:35
- 01:17
11:18 | 10. 14:45
- 03:55
10:50 | 11. 21:30
- 09:55
11:35 |

Add 5 h 30 min to each time.

- | | | | |
|---------------------------|---------------------------|---------------------------|---------------------------|
| 12. 03:00
08:30 | 13. 06:45
12:15 | 14. 10:30
16:00 | 15. 01:48
07:18 |
|---------------------------|---------------------------|---------------------------|---------------------------|

Solve.

- Sam got on the bus at 08:25. He arrived at his destination 2 h 20 min later. What time was it?
10:45
- Zena finished her homework at 20:15. It had taken her 35 min. What time did she start?
19:40

Pedal Puzzle



Ellen and Marta live 50 km apart. They decided to ride their bicycles to meet each other. Ellen pedalled 12 km/h and Marta 8 km/h. They both left home at noon. At what time did they meet? Use a diagram.

14:30

281

Assigning the Practice

Minimum: 1-13, 16

Average: 1-17

Enriched: 1-17

Reinforcement

1. Ask the students to complete the following tables involving time.

a. A train takes 4 h 30 min to travel from Toronto to Ottawa. Copy the chart. Write in the arrival times.

Lv. Toronto	Arr. Ottawa
06:00	
10:45	
12:30	
17:00	
19:10	

b. How long was each flight?

Flight Schedule		
Lv.	Arr.	Time
05:00	08:30	
07:15	10:00	
09:30	12:15	
10:30	13:30	
14:45	17:35	

c. The members of the Lastman family went to bed at different times. From the information below, tell what time each person woke up.

Person	Went to bed	Time slept	Woke up
Mrs. Lastman	23:15	7 h	
Mr. Lastman	23:30	6 h 45 min	
Ellen	20:45	10 h	
Jonah	21:30	9 h 40 min	
Danielle	19:15	11 h 45 min	

2. Have the students calculate and compare the duration of each trip from Calgary to Regina from the schedule on page 280. Ask, "Which is the longest trip? the shortest?"

Enrichment

1. Assign *Pedal Puzzle* at the bottom of page 281. Have the students explain their problem-solving strategy. Let them show any diagrams they might have made.

2. Obtain actual bus, train, or air-plane timetables. Prepare questions about arrivals, departures, and trip durations to accompany the timetables.

Extra Practice

Solve.

- What time does the 10:30 train arrive?
13:30
- How long does it take the 07:00 train to make the trip?
3h
- Suppose you leave on the last train in the morning. What time does your train arrive?
13:30
- Suppose you leave on the first train in the afternoon. What time does your train arrive?
19:00

Subtract.

- | | | | |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 5. 09:00
- 04:00
05:00 | 6. 13:30
- 04:00
09:30 | 7. 15:30
- 04:20
11:10 | 8. 12:30
- 04:45
07:45 |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|

Add 4 h 15 min to each time.

- | | | | |
|--------------------------|---------------------------|---------------------------|---------------------------|
| 9. 06:00
10:15 | 10. 10:50
15:05 | 11. 18:30
22:45 | 12. 12:45
17:00 |
|--------------------------|---------------------------|---------------------------|---------------------------|

Worksheet M17

Pages 280-281

Train Schedule	
Lv.	Arr.
07:00	10:00
09:00	12:00
10:30	13:30
15:00	19:00
22:00	01:30

UNIT 12 LESSON 9

Objective M18

Use a time zone map.

Introducing the Lesson

Show the class a globe of the world. Turn out the lights and shine a flashlight on it to represent the sun. Turn the globe. Demonstrate that it is day in one half the world while it is night in the other half.

As one travels around the world, the time of day gradually changes. So, time zones have been instituted around the world, each one hour apart (sometimes a half hour) so that in every part of the world noon will be the middle of the day and midnight will be the middle of the night.

Teaching the Lesson

Show how the light shines on the eastern parts of Canada before it directly shines on the western parts. Point out the time zones in Canada as you turn the globe toward the light.

Read and discuss the time zone map at the top of page 282. Have the students name the six time zones and various cities in each zone. Explain that as you go from west to east on the map, the new time zone is 1 h ahead, except for Newfoundland time which is $\frac{1}{2}$ h ahead of Atlantic Time.

Record the present time on the chalkboard. Have the students tell what time it is now in each of the other five time zones across Canada. Also record the time school starts and ends each day. Have the students name the times in other Canadian time zones as your school day begins and ends.

Time Zones

The map shows the **time zones** across Canada.

As you go from west to east (left to right), the time is one hour ahead in each zone. (Newfoundland Time is only a half-hour ahead of Atlantic Time.)



EXERCISES

Name the time zone.

- | | | | | | |
|---------------|---------|-------------|----------|--------------|---------|
| 1. Whitehorse | Pacific | 2. Edmonton | Mountain | 3. Montreal | Eastern |
| 4. Vancouver | Pacific | 5. Halifax | Atlantic | 6. Churchill | Central |
| 7. St. John's | Nfld. | 8. Regina | Central | 9. Ottawa | Eastern |
| 10. Saskatoon | Central | 11. Calgary | Mountain | 12. Winnipeg | Central |

Complete.

13. Mountain Time is **1** h ahead of Pacific Time.

14. Pacific Time is **3** h behind Eastern Time.

When it is 08:00 in Fredericton, what time is it in

- | | | |
|-----------------|---------------|----------------|
| 15. St. John's? | 16. Winnipeg? | 17. Vancouver? |
| 08:30 | 06:00 | 04:00 |

When it is 04:00 in Edmonton, what time is it in

- | | | |
|---------------|--------------------|--------------|
| 18. Montreal? | 19. Prince Rupert? | 20. Regina? |
| 06:00 | 03:00 | 05:00 |

282

Using the Exercises

- Questions 1 to 12 require the students to use the map to name the time zones for various Canadian cities.
- Questions 13 and 14 involve finding the difference between time zones.
- Questions 15 to 20 require the students to locate two Canadian cities on the map, identify the time zones in which they are located, and use the time difference between the two zones to find the time. Note that 24 h clock times are used.

PRACTICE

Name the time zone.

1. Prince Rupert Pacific
2. Charlottetown Atlantic
3. Quebec City Eastern
4. Yellowknife Mountain
5. Fredericton Atlantic
6. Toronto Eastern

Complete.

7. Newfoundland Time is $\frac{1}{2}$ h ahead of Atlantic Time.
8. Central Time is $\frac{1}{2}$ h behind Eastern Time.
9. Mountain Time is $\frac{2}{2}$ h behind Eastern Time.

When it is 09:00 in Quebec City, what time is it in

10. Halifax? 10:00
11. Calgary? 07:00
12. Ottawa? 09:00

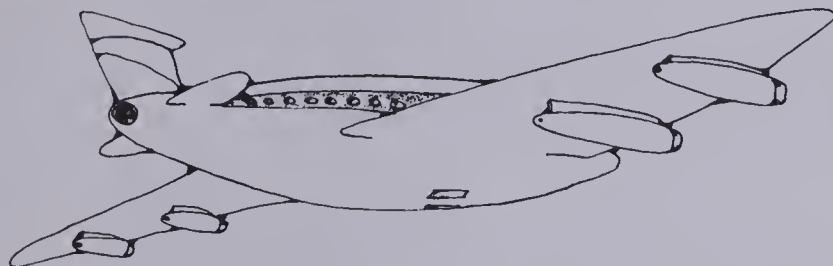
When it is 14:00 in Saskatoon, what time is it in

13. Prince Rupert? 12:00
14. Toronto? 15:00
15. Fredericton? 16:00

Solve.

16. A hockey game is broadcast from Winnipeg at 20:00. What time will it be for listeners in Montreal? 21:00
17. At noon in Ottawa on Canada Day, "Oh Canada" was broadcast. What time did people in Vancouver hear it? 09:00

Against the Clock



A jet flies from Vancouver to Montreal in 5 h 15 min. If it leaves Vancouver at 04:40,

- a. what time is it in Montreal when it arrives? 12:55
- b. what time is it in Vancouver when the plane arrives in Montreal? 9:55

283

Extra Practice

Worksheet M18

Pages 282-283

When it is 15:00 in Vancouver, what time is it in

1. Edmonton? 16:00
2. Halifax? 19:00
3. Churchill? 17:00
4. Ottawa? 18:00
5. Regina? 17:00
6. Whitehorse? 15:00

Complete.

7. Mountain Time is 3 h ahead of Atlantic Time.
8. Pacific Time is 4 h ahead of Atlantic Time.
9. Central Time is 2 h ahead of Atlantic Time.
10. Eastern Time is 1 h ahead of Atlantic Time.

Assigning the Practice

Minimum: 1-16

Average: 1-17

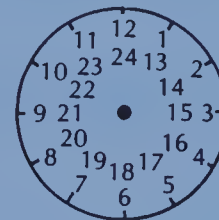
Enriched: 1-17

Reinforcement

1. Give each student a worksheet of clock faces. Have them show what time it is in other time zones when it is, e.g., 09:00 Mountain Time.



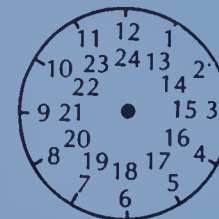
Pacific Time



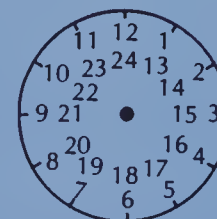
Central Time



Eastern Time



Atlantic Time



Newfoundland Time

2. Divide the students into six groups, one for each Canadian time zone. Play a "What time is it?" game. In turn, one group names a time and all other groups must give the corresponding time in their zone. Students within a group take turns answering.

Enrichment

1. Assign *Against the Clock* at the bottom of page 283.
2. Have the students investigate time zones in the rest of the world and then prepare an oral and/or pictorial report.

Objective PS12

Solve problems involving time and money.

Introducing the Lesson

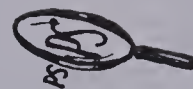
Review the time and money concepts learned with this unit. Focus especially on averaging, making change, and finding differences in times and time zones. Use examples like the following.

- 46 cm, 85 cm, 57 cm, 74 cm
What is the average length?
- You had \$20, spent \$14.95, and \$3.26.
How much money is left?
- 07:30 in Vancouver.
What time is it in Toronto?

Teaching the Lesson

Assign the quiz on page 284. After the students have completed it, discuss each problem. Let the students explain their problem-solving strategies. If the solution to a problem was not clear, provide chalkboard drawings of the situation.

Problem Solving Quiz



Choose the correct answer.

- It is 17:00 in Vancouver. What time is it in Toronto?
a. 14:00 b. 21:00 c. 20:00 d. 16:00
- Mr. Tucker shipped three cartons for \$38, \$45, and \$43.
What is the average cost per carton?
a. \$42 b. \$43 c. \$126 d. \$35.33
- Rope that is 10 mm in diameter sells for 25¢/m.
How many metres can you buy for \$5.00?
a. 40 b. 20 c. 5 d. 50
- Lila bought 24 m² of carpet at \$32.95/m².
How much did the carpet cost?
a. \$56.95 b. \$187.70 c. \$6721.80 d. \$790.80
- A train leaves at 13:25 and arrives in the next city 1 h 35 min later. What time does it arrive?
a. 14:00 b. 15:00 c. 12:10 d. 14:50
- Avtar works 35 h a week and earns \$280.
What is his hourly wage?
a. \$5 b. \$7 c. \$8 d. \$9
- Marcia has to practise the piano for 45 min.
She wants to be finished by 05:15. What time should she start?
a. 03:30 b. 03:45 c. 04:15 d. 04:30
- In 1976, the Men's Slalom was won with a time of 2 min 03.29 s.
In 1980, it was won with a time of 1 min 44.26 s. How much better was the 1980 time?
a. 19.03 s b. 47.55 s c. 59.03 s d. 40.97 s

Using the Exercises

- Questions 1 to 8 are intended to be done independently to check each student's problem-solving skills.

PRACTICE

Solve.

- Chris studied 40 min one night, 1 h 10 min the next night, and 35 min the next night. On average, how long did he study a night? **48.3 min**
- A car dealer bought a car for \$4745 and sold it for \$5000. How much money did she make? **\$255**
- A bus leaves at 03:50 and arrives at 05:15. How long does the trip take? **1 h 25 min**
- Mina bought a sofa and chair set for \$1249.95, end tables for \$369.50, and a lamp for \$69.90. What was the total cost of these items? **\$1689.35**

REVIEW

Are the two figures similar?

- G10 1. **Yes**
2. **No**
- G11 3. **Yes**
4. **No**

Solve.

- G12 5. If a scale is 1 cm = 10 km, what does 4 cm represent? **40 km**
6. If a scale is 1 cm = 5 m, what does 5 cm represent? **25 m**

Add or subtract.

- M17 7.
$$\begin{array}{r} 7 \text{ h } 15 \text{ min} \\ - 2 \text{ h } 48 \text{ min} \\ \hline 4 \text{ h } 27 \text{ min} \end{array}$$
8.
$$\begin{array}{r} 10:30 \\ - 02:25 \\ \hline 08:05 \end{array}$$
9.
$$\begin{array}{r} 6 \text{ h } 20 \text{ min} \\ + 3 \text{ h } 55 \text{ min} \\ \hline 10 \text{ h } 15 \text{ min} \end{array}$$

Solve.

- M18 10. When it is 10:00 in Ottawa, what time is it in Edmonton? **08:00**
11. When it is 08:30 in Charlottetown, what time is it in St. John's? **09:00**

285

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

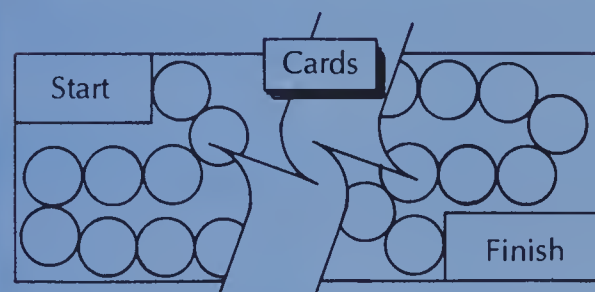
Review Exercises

Questions	Objective	Pages
1-2	G10	274-275
3-4	G11	276-277
5-6	G12	278-279
7-9	M17	280-281
10-11	M18	282-283

Reinforcement

1. Ask each student to make up 2 or 3 time and money word problems. Ask a student to read his or her problem aloud and challenge the rest of the class to solve it. The first one to have the correct solution then reads his or her problem.

2. Write some of the students' time and money problems and some of your own problems on individual cards. Award a number of points (according to degree of difficulty) for each problem. Make a game board having a path from start to finish. Players, in turn, turn over a card, solve the problem, and if correct, advance on the game board the number of points given on the card. Incorrect answers mean moving back one space. The first player to reach the finish wins.



Enrichment

Obtain several travel brochures containing information on trip costs and on transportation times. Make a display of these brochures. Have the students use them to plan a "dream" holiday. Ask them to describe their trip and to include cost estimates and travel times. Display their plans.

Problem Solving Activities

Assign Level 5, Unit 12.

Extra Practice

Worksheet PS12

Pages 284-285

- The Burns family drove to their cottage. They started at 8:15 a.m. and arrived at noon. How long did the trip take? **3 h 45 min**
- Jack earned \$240 in June, \$325 in July, and \$295 in August. On average, how much did he earn per month? **\$287**
- When it is 13:40 in Winnipeg, what time is it in Vancouver? **11:40**
- Mia received \$20 for her birthday. She spent \$5.25 on a record and \$12.95 on a T-shirt. How much money did she have left? **\$1.80**

UNIT 12 Objective	Test Questions	Pages
A50	1, 2	266-267
M15	3, 4	268-269
M16	5, 6	270-271
G10	7, 8	274-275
G11	9, 10	276-277
G12	11	278-279
M17	12-14	280-281
M18	16	282-283
PS	15	

TEST

UNIT 12

Find the average. Round to the nearest whole number.

1. 44, 37, 33, 36, 45 **39** 2. 163, 145, 92, 101 **125**

Add or subtract.

3. $\$1011.95 + \6.89 **$\$1018.84$** 4. $\$2080.27 - \192.83 **$\$1887.44$**

Count the change.

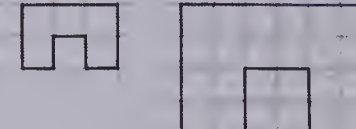
5. for $\$3.85$ from $\$10.00$ **$\$6.15$** 6. for $\$8.50$ from $\$20.00$ **$\$11.50$**

Are the two figures similar?

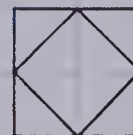
7.  **Yes**

8.  **No**

9.  **No**

10.  **Yes**

11. On 1 cm grid paper, make an enlargement of the figure, so that its dimensions are twice as large.



Add or subtract.

12. $13 \text{ h } 15 \text{ min}$
 $+ 2 \text{ h } 45 \text{ min}$
 $16 \text{ h } 0 \text{ min}$

13. $10 \text{ h } 30 \text{ min}$
 $- 5 \text{ h } 10 \text{ min}$
 $5 \text{ h } 20 \text{ min}$

14. $15:05$
 $- 08:16$
 $06:49$

Solve.

15. The temperature rose from 15.2°C in the morning to 19.1°C in the afternoon. By how much did the temperature rise? **3.9°C**

16. When it is 05:00 in Winnipeg, what time is it in Quebec City? **06:00**

Post-test

Unit 12

Find the average. Round to the nearest whole number.

1. 18¢, 9¢, 25¢, 14¢, 21¢ **17¢** 2. 267 g, 280 g, 292 g, 255 g **274 g**

Add or subtract.

3. $\$2734.29 + \$87.48 =$ **$\$2821.77$** 4. $\$5000.00 - \$987.24 =$ **$\$4012.76$**

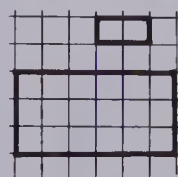
Count the change.

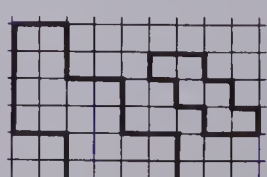
5. for $\$8.29$ from $\$10.00$ **$\$1.71$** 6. for $\$17.58$ from $\$20.00$ **$\$2.42$**

Are the two figures similar?

7.  **Yes**

8.  **No**

9.  **Yes**

10.  **No**

Add.

1. $\begin{array}{r} 36.105 \\ + 7.905 \\ \hline 44.010 \end{array}$	2. $\begin{array}{r} 27.480 \\ + 54.637 \\ \hline 82.117 \end{array}$	3. $\begin{array}{r} 16.029 \\ + 0.984 \\ \hline 17.013 \end{array}$	4. $\begin{array}{r} 401.637 \\ + 82.907 \\ \hline 484.544 \end{array}$
--	---	--	---

Subtract.

5. $\begin{array}{r} 38.426 \\ - 9.517 \\ \hline 28.909 \end{array}$	6. $\begin{array}{r} 40.065 \\ - 23.189 \\ \hline 16.876 \end{array}$	7. $\begin{array}{r} 923.164 \\ - 45.687 \\ \hline 877.477 \end{array}$	8. $\begin{array}{r} 60 \\ - 37.328 \\ \hline 22.672 \end{array}$
--	---	---	---

Write as decimals.

9. thirteen thousandths 0.013 10. four thousandths 0.004
 11. one hundred seventy-nine thousandths 0.179

Round to the nearest tenth.

12. $12.255 \rightarrow 12.3$	13. $0.841 \rightarrow 0.8$	14. $635.049 \rightarrow 635.0$	15. $43.970 \rightarrow 44.0$
-------------------------------	-----------------------------	---------------------------------	-------------------------------

Round to the nearest hundredth.

16. $4.475 \rightarrow 4.48$	17. $632.795 \rightarrow 632.80$	18. $15.413 \rightarrow 15.41$	19. $286.055 \rightarrow 286.06$
------------------------------	----------------------------------	--------------------------------	----------------------------------

Write as a percent.

20. $\frac{9}{100} \rightarrow 9\%$ 21. $\frac{54}{100} \rightarrow 54\%$ 22. $0.72 \rightarrow 72\%$ 23. $0.01 \rightarrow 1\%$ 24. $\frac{100}{100} \rightarrow 100\%$

Write as a fraction with a denominator of 100.

25. $53\% \rightarrow \frac{53}{100}$	26. $4\% \rightarrow \frac{4}{100}$	27. $95\% \rightarrow \frac{95}{100}$	28. $12\% \rightarrow \frac{12}{100}$	29. $300\% \rightarrow \frac{300}{100}$
---------------------------------------	-------------------------------------	---------------------------------------	---------------------------------------	---

Solve.

30. $10\% \text{ of } 80 = \blacksquare 8$ 31. $37\% \text{ of } 100 = \blacksquare 37$ 32. $50\% \text{ of } 25 = \blacksquare 12.5$

33. The Murdocks' car uses 1 L of gasoline every 5 km. If gasoline sells for 36.5¢ a litre, how much does the gasoline for a trip of 100 km cost? $\$7.30$

34. Jennifer receives 3¢ for each flyer that she delivers. If she delivers 45 flyers a night for 5 nights, how much money does she earn? $\$6.75$

11. On 1 cm grid paper, make an enlargement of the figure so that its dimensions are twice as large.



Add or subtract.

12. $\begin{array}{r} 10 \text{ h } 35 \text{ min} \\ + 7 \text{ h } 15 \text{ min} \\ \hline 17 \text{ h } 50 \text{ min} \end{array}$	13. $\begin{array}{r} 6 \text{ h } 15 \text{ min} \\ - 20 \text{ min} \\ \hline 5 \text{ h } 55 \text{ min} \end{array}$	14. $\begin{array}{r} 11:15 \\ - 02:30 \\ \hline 08:45 \end{array}$
---	--	---

Solve.

15. Mr. Bailey earned \$850 in five days. How much is that per day? $\$170/\text{day}$
 16. If it is 07:00 in Edmonton, what time is it in Toronto? $09:00$

UNIT 13

Number Theory

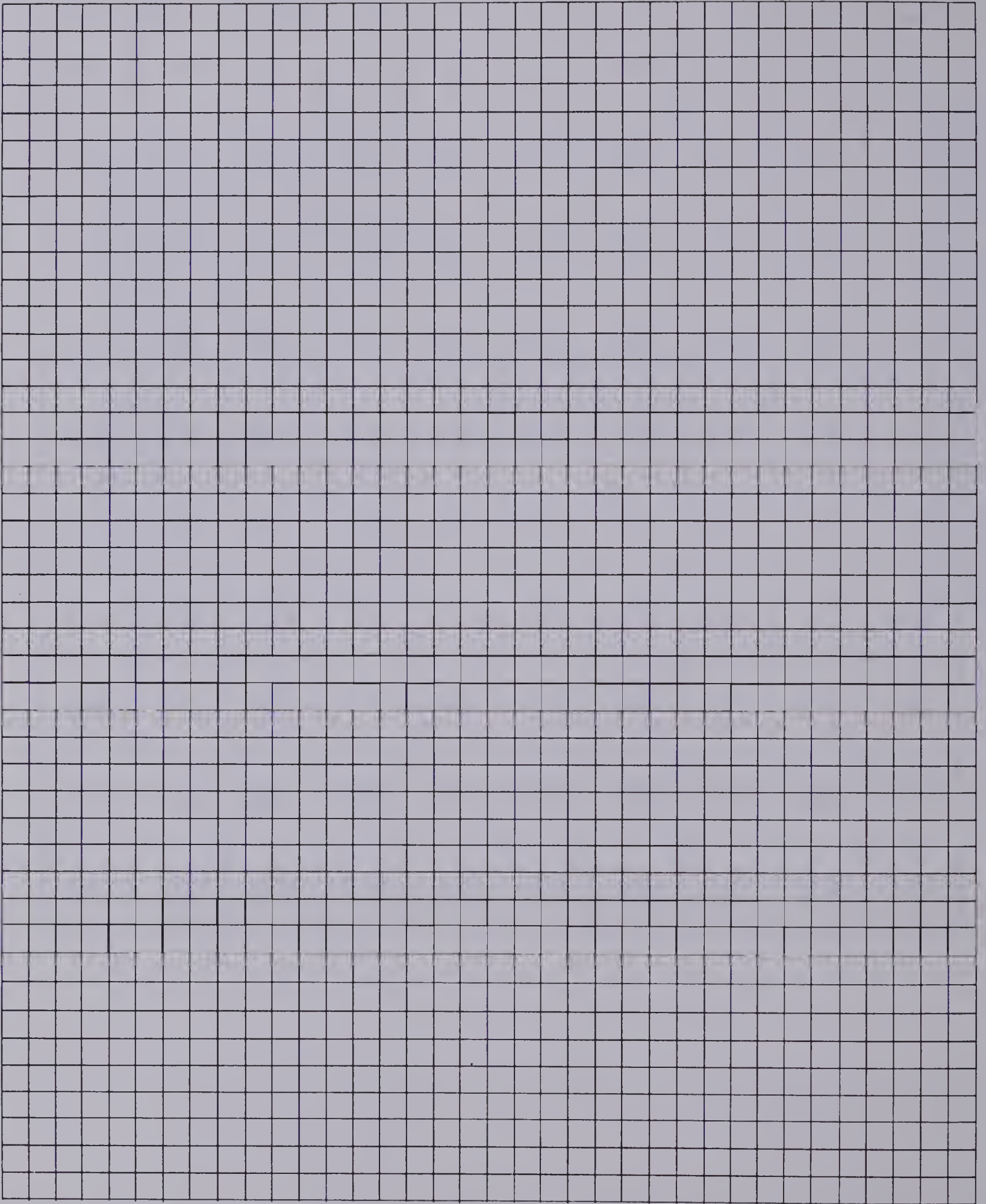
Theme: Number Patterns

Lesson	Objective		Pages
Preview		Review multiplication and division.	289
1	A51	Calculate multiples.	290–291
2	A52	Find the least common multiple (LCM) of two or three numbers.	292–293
3	A53	Recognize numbers divisible by 2, 5, 10, and 9.	294–295
4	A54	Find the factors of a whole number.	296–297
5	A55	Identify prime and composite numbers.	298–299
6	A56	Find the greatest common factor (GCF) of two or three numbers.	300–301
7	A57	Use the rules for order of operations to simplify number expressions.	302–303
8	A58	Use the commutative, associative, and distributive properties to simplify calculations.	304–305
9	N22	Read and write Roman numerals.	306–307
10	PS13	Solve problems involving factors and multiples.	308–309
Test		Number theory	310
Review		Measurement	311

Hundred Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

5 mm grid



About This Unit

Although number theory topics have been dealt with earlier in the *Houghton Mifflin Mathematics* program, here in Grade 5 is the first time an entire chapter is devoted to these concepts.

Factors, products, multiples, and divisors are introduced and used early in the program.

Computation using the properties (commutative, associative, distributive, and of zero and one) is begun in Grade 3 and further developed in Grade 4 with such lesson topics as: multiplication and addition, the order property, and zero and one in multiplication and division. (Note: the concepts are developed simply and without requiring the student to name the properties.) By the time the student reaches Grade 5, he or she should have considerable experience in number theory topics.

The study of number theory develops sets of skills that are very useful for other areas of mathematics. For example, an understanding of divisibility and of prime numbers is useful for factoring numbers. Finding the GCF is useful for reducing, multiplying, and dividing fractions. Finding the LCM is useful when comparing, adding, and subtracting fractions. These skills, combined with those involved in simplifying number expressions and in recognizing special computational properties, lead to more complex work in algebra. Hence, important foundations are being built at this time that will be expanded upon in each succeeding grade.

Ideas

A hundred chart is an effective way to illustrate number theory patterns.

a. Multiples of 2, 3, 4, 5, 6, etc. can be coloured on separate hundred charts and the patterns compared. Once the multiples have been coloured, the numbers having 2, 3, 4, 5, 6, etc. as factors also can be seen.

Multiples of 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

Multiples of 6

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

4, 8, 12, etc. have 4 as a factor.

6, 12, 18, etc. have 6 as a factor.

The LCM of 4 and 6 is 12.

b. Prime and composite numbers can be determined with a hundred chart as described in Lesson 5 on page 298. Once the numbers in the chart have been marked as prescribed on the page, the prime factors of the composite numbers become obvious. These prime factors can be used in determining all factors of a given number.

41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

Key: multiples of 2: \

multiples of 3: /

multiples of 5: |

multiples of 7: —

Prime factors of 42: 2, 3, 7.

$$2 \times 3 \times 7 = 1 \times 42 = 42$$

$$2 \times 3 \times 7 = 2 \times 21 = 42$$

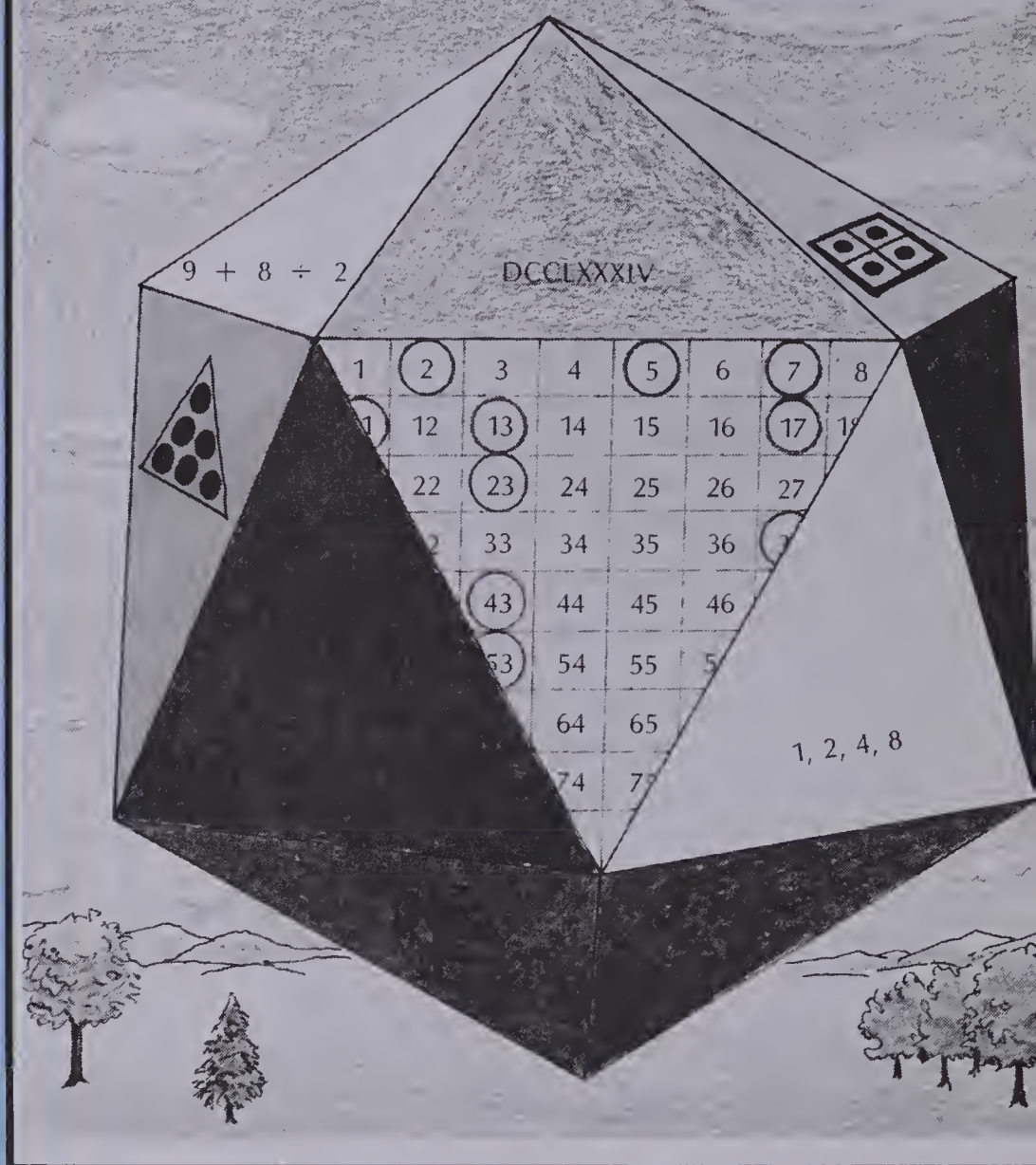
$$3 \times 2 \times 7 = 3 \times 14 = 42$$

$$3 \times 2 \times 7 = 6 \times 7 = 42$$

Factors of 42: 1, 2, 3, 6, 7, 14, 21, 42.

UNIT 13

NUMBER THEORY



Unit 13 Objective	Test Questions	Pages
A51	1-3	290-291
A52	4-6	292-293
A53	7	294-295
A54	8-10	296-297
A55	11-12	298-299
A56	13-15	300-301
A57	16-18	302-303
A58	19-21	304-305
N22	22-24	306-307
PS	25	

Pretest

Unit 13

Write the next three multiples.

1. 7, 14, 21, 28, 35, 42 2. 18, 21, 24, 27, 30, 33 3. 36, 45, 54, 63, 72, 81

List the multiples of each Find the LCM

4. 10 and 12 LCM: 60 5. 6 and 9 LCM: 18 6. 3 and 8 LCM: 24
 10: 10, 20, 30, 40, 50, 60 6: 6, 12, 18, 24 3: 3, 6, 9, 12, 15, 18, 21, 24, 27
 12: 12, 24, 36, 48, 60 8: 8, 16, 24, 32

7. Write the quotients which have no remainder.

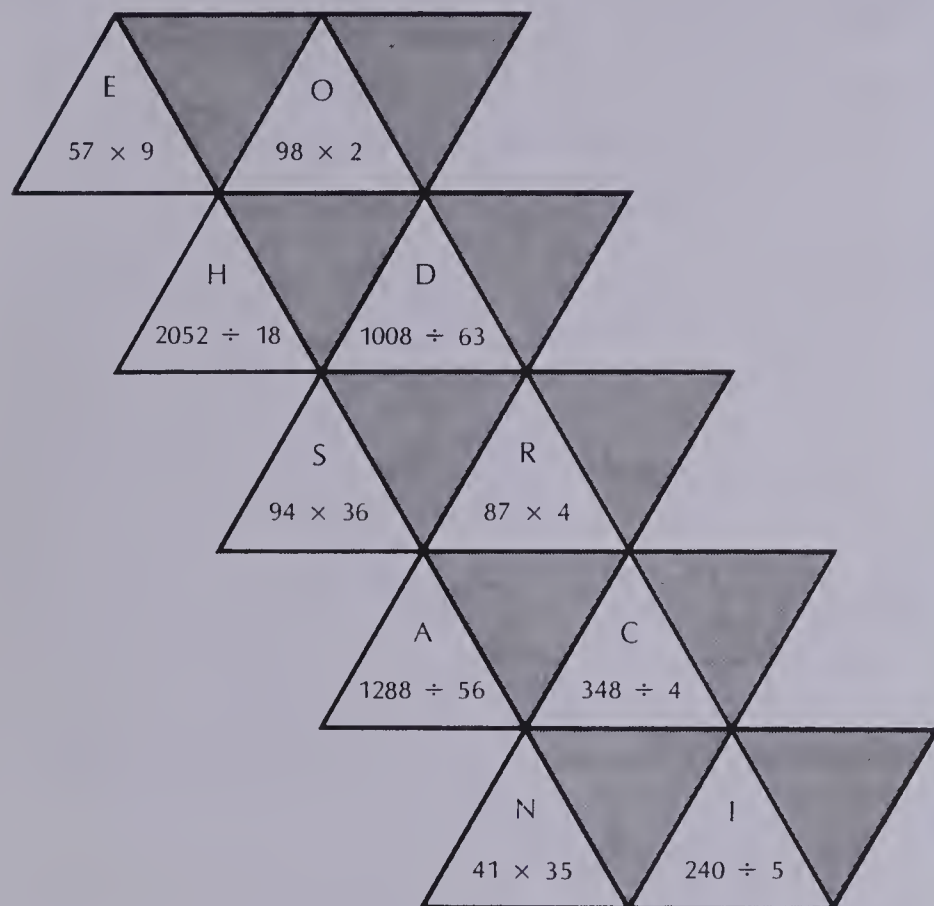
Number	Divisible by 2	Divisible by 5	Divisible by 9	Divisible by 10
7425		<u>1485</u>	<u>825</u>	
2160	<u>1080</u>	<u>432</u>	<u>240</u>	<u>216</u>
6314	<u>3157</u>			

List the factors.

8. 28 1, 2, 4, 7, 14, 28 9. 29 1, 29 10. 54 1, 2, 3, 6, 9, 18, 27, 54
 11. What are the prime numbers between 4 and 15? 5, 7, 11, 13

Something Special

Find the answers to each calculation. Then decode the word below.



I C O S A H E D R O N

48 87 196 3384 23 114 513 16 348 196 1435

This word is the name of the object shown on page 288.

Trace the pattern above to make one for yourself.

289

UNIT 13

PREVIEW

Suggestions

Write the following sets of numbers on the chalkboard. Ask the students to write a multiplication and a division sentence for each.

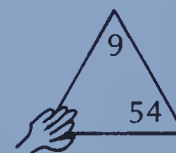
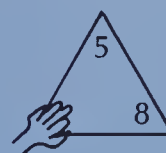
9, 63, 7 5, 25, 125 15, 60, 4

Review the fact that multiplication and division are opposite operations. Point out that in multiplication the product is missing, while in division, one of the factors is missing.

$$\begin{array}{rcl} \text{factor} & \times & \text{factor} = \text{product} \\ 9 & \times & 7 = 63 \end{array}$$

$$\begin{array}{rcl} \text{product} \div \text{factor} & = & \text{factor} \\ 63 \div 7 & = & 9 \end{array}$$

Show triangular cards similar to the ones below. Ask the students to decide whether a factor or a product is covered and then to multiply or divide to determine the covered number.



About the Page

Point out the illustration on page 288. Note that the illustrations on the triangular faces of the shape give a preview of the concepts in this unit. Explain that the 20 triangular faces of the shape can be seen in its pattern on page 289. When the students successfully complete the multiplications and divisions on page 289, they will then be able to decode the name of the shape. *Icosahedron*

Previously developed multiplication and division skills are exercised on the page. The code is meant to be a self-checking device for the students.

Enrichment

Students can make larger icosahedrons than the one on page 289 by using a larger equilateral triangle. The triangle then can be traced 20 times in the pattern given. Once several icosahedrons have been made and displayed, discuss the numbers of faces, edges, and vertices.

12. What are the composite numbers between 7 and 17? 8, 9, 10, 12, 14, 15, 16

List the factors of each. Find the GCF.

13. 12 and 20 GCF: 4 14. 18 and 24 GCF: 6 15. 27 and 28 GCF: 1
 Evaluate: 12: 1, 2, 3, 4, 6, 12 18: 1, 2, 3, 6, 9, 18 27: 1, 3, 9, 27
20: 1, 2, 4, 5, 10, 20 24: 1, 2, 3, 4, 6, 8, 12, 24 28: 1, 2, 4, 7, 14, 28

16. $54 \div 6 + 3 \times 9$ 17. $38 \times (6 - 5)$ 18. $29 - 5 \div 5$
36 38 28

Calculate mentally. Write the answer.

19. $18 + 53 + 82$ 20. $20 \times (5 \times 87)$ 21. 7×64
153 8700 448

Write the number in Roman numerals.

22. 87 LXXXVII 23. 645 DCXLV 24. 2532 MMDXXXII

Solve.

25. Tanya is making party favours with 32 chocolate kisses and 48 peppermints. What is the greatest number of party favours she can make so that each has the same number of chocolate kisses and the same number of peppermints? 16

Objective A51

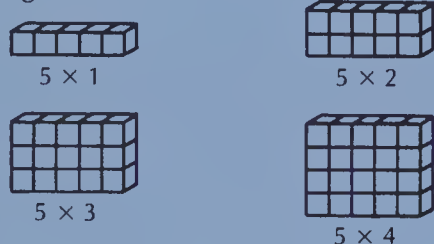
Calculate multiples.

Introducing the Lesson

Review skip counting. Discuss and demonstrate examples of situations in which skip counting is used (counting coins, counting a large number of people, counting pieces of candy, etc.)

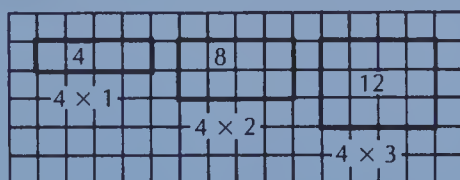
Teaching the Lesson

Show arrays of Centicubes on an overhead projector to illustrate counting by 5s. Point out that each array represents the product of 5 and a whole number, or a **multiple of 5**. Note that all arrays contain 5 cubes along one side.



Show examples of other sets of multiples.

Give each student a sheet of graph paper. Have them make rectangles to illustrate the multiples of various other numbers, for example, of the multiples of 4.



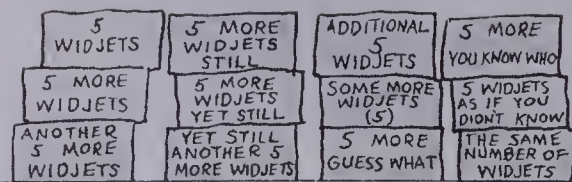
Students should realize that the product of any basic multiplication fact is a multiple of two factors: $4 \times 2 = 8$. Eight is a multiple of 4 and 2.

Show the students how division can be used to test multiples. Ask, "Is 24 a multiple of 8?"

$$\begin{array}{r} 3 \\ 8 \overline{)24} \end{array} \text{ Yes, because } 8 \times 3 = 24.$$

Read and discuss the top of page 290. Show a 100 chart on the overhead projector. Have the students count by 2s, 3s, 4s, etc. as you colour their counting on the chart. Stress the vertical and diagonal patterns formed.

Multiples



The **multiples** of 5 are: 5, 10, 15, ...
(... means "and so on")

A multiple of 5 is a **product** of 5 and a whole number.

$$\begin{array}{ccc} 5, & 10, & 15 \\ & 20, & 25 \\ & 30, & 35 \\ & 40, & 45 \\ & 50, & 55 \\ & 60, & 65 \\ & 70, & 75 \\ & 80, & 85 \\ & 90, & 95 \end{array}$$

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

EXERCISES

Copy and write the next seven multiples.

- 2, 4, 6, , , , ... *8, 10, 12, 14, 16, 18, 20*
- 3, 6, 9, , , , ... *12, 15, 18, 21, 24, 27, 30*
- 4, 8, 12, , , , ... *16, 20, 24*
- 10, 20, 30, , , , ... *40, 50, 60, 70, 80*
- 6, 12, 18, , , , ... *24, 30, 36, 42, 48, 54, 60*
- 12, 24, 36, , , , ... *48, 60, 72, 84, 96, 108, 120*
- What are the first seven multiples of 7? *7, 14, 21, 28, 35, 42, 49*
- What are the first seven multiples of 8? *8, 16, 24, 32, 40, 48, 56*
- What are the multiples of 9 between 26 and 55? *27, 36, 45, 54*
- What are the multiples of 11 between 10 and 23? *11, 22*
- What are the multiples of 20 between 19 and 61? *20, 40, 60*
- What are the multiples of 5 between 34 and 94? *35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90*

Using the Exercises

- Questions 1 to 6 require the students to list multiples as they continue counting patterns.
- Questions 7 to 12 ask for specific sets of multiples. Some students may require a 100 chart to answer these.

PRACTICE

Copy and write the next seven multiples.

1. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
2. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
3. 11, 22, 33, 44, 55, 66, 77, 88, 99, 110
4. 30, 60, 90, 120, 150, 180, 210, 240, 270, 300
5. 12, 14, 16, 18, 20, 22, 24, 26, 28, 30
6. 15, 18, 21, 24, 27, 30, 33, 36, 39, 42
7. 20, 24, 28, 32, 36, 40, 44, 48, 52, 56
8. 30, 36, 42, 48, 54, 60, 66, 72, 78, 84
9. 49, 56, 63, 70, 77, 84, 91, 98, 105, 112
10. 24, 32, 40, 48, 56, 64, 72, 80, 88, 96

Each group of numbers contains multiples of what number?

11. 44, 48, 52, 56, 60 4
12. 26, 28, 30, 32, 34 2
13. 25, 30, 35, 40, 45 5
14. 64, 72, 80, 88, 96 8
15. 6, 21, 9, 15, 27 3
16. 49, 35, 14, 28, 42 7

17. What are the first four multiples of 6 after 30?
36, 42, 48, 54
18. What are the first five multiples of 3 after 17?
18, 21, 24, 27, 30
19. What are the multiples of 9 less than 50?
9, 18, 27, 36, 45
20. What are the multiples of 10 less than 51?
10, 20, 30, 40, 50
21. What are the multiples of 4 between 43 and 65?
44, 48, 52, 56, 60, 64
22. What are the multiples of 8 between 47 and 73?
48, 56, 64, 72
23. What are the first ten multiples of 100?
100, 200, 300, 400, 500, 600, 700, 800, 900, 1000

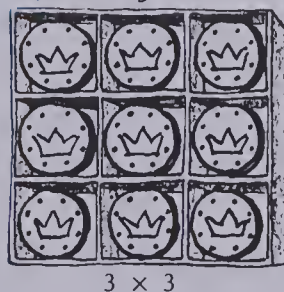
Square Numbers

The checkers show the first 3 square numbers.

Draw a picture of the next three square numbers.

Name the square numbers less than 230.

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169,
196, 225



291

Assigning the Practice

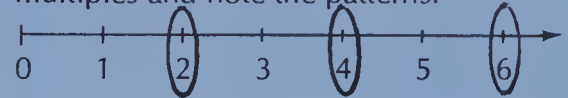
Minimum: 1-10, 17-23

Average: 7-23

Enriched: 7-23

Reinforcement

1. Give the students number lines to 100 and 100 charts. Have them mark sets of multiples and note the patterns.



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

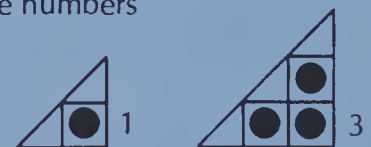
2. Have the students find all the numbers for which 24 is a multiple. This can be done at the simplest level by building arrays of cubes; it can be solved at an abstract level by finding all the divisors of 24.

3. Play "Buzz". To play the 5s Buzz game, players, in turn, count by ones. Each time a student comes to a multiple of 5 he or she must instead say, "Buzz", to stay in the game. Many different multiples can be used.

Enrichment

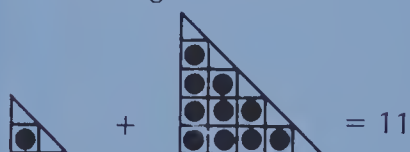
Give the students graph paper as they do *Square Numbers* at the bottom of page 291. Some students may also be interested in investigating the following.

1. triangle numbers



2. sums of triangle numbers

Every whole number is the sum of two or three triangle numbers.



Extra Practice

Worksheet A51

Pages 290-291

Complete.

1. 6, 12, 18, 24, 30, 36, 42
2. 10, 20, 30, 40, 50, 60, 70
3. 45, 50, 55, 60, 65, 70, 75
4. 4, 8, 12, 16, 20, 24, 28
5. 12, 24, 36, 48, 60, 72, 84
6. 500, 600, 700, 800, 900, 1000, 1100
7. 45, 54, 63, 72, 81, 90, 99
8. 49, 56, 63, 70, 77, 84, 91
9. 18, 24, 30, 36, 42, 48, 54
10. 11, 22, 33, 44, 55, 66, 77
11. 63, 60, 57, 54, 51, 48, 45
12. 80, 72, 64, 56, 48, 40, 32
13. 15, 30, 45, 60, 75, 90, 105
14. 100, 96, 92, 88, 84, 80, 76

UNIT 13 LESSON 2

Objective A52

Find the least common multiple (LCM) of two or three numbers.

Introducing the Lesson

Ask the students to name the multiples of a number and then list them on the chalkboard. Note that some multiples are *common* to more than one number. Connect the common multiples.

2: 2, 4, 6, 8, 10, 12, 14, 16, ...
3: 3, 6, 9, 12, 15, 18, 21, 24, ...

Point out that 12, for example, is a multiple common to 2 and 3 since 12 is evenly divisible by 2 and by 3.

$$\begin{array}{r} 6 \\ 2 \overline{)12} \end{array} \quad \begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$$

Discuss several other numbers with common multiples.

Teaching the Lesson

Read and discuss the problem at the top of page 292. Illustrate the situation with two chalkboard number lines which go beyond 36 days. Point out that zero on the number line represents today. Note that Jan has both to wash dishes and sweep the floor on the 12th day, the 24th day, the 36th day, and so on. Ask, "When is the next time, after today, that Jan has to do both chores again?" *In 12 days.*

Explain the same situation using lists of multiples as shown on page 292. Point out that there are several multiples common to 3 and 4, but that the least or smallest (12) is the answer to the question. Explain that 12 is called the **least common multiple** of 3 and 4.

Pose this problem. "Jan washes dishes every third day, sweeps the floor every fourth day, and waters the plants every fifth day. If she does all three chores today, in how many days will she do all three again?" Let the students use chalkboard number lines to illustrate the situation. Also have them list multiples and find the least common multiple to solve the problem.

Provide practice with listing multiples and finding the LCM of sets of 2 or 3 numbers.

Least Common Multiple

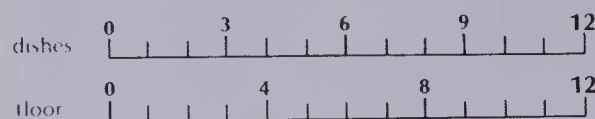
Jan helps with the family chores.

She washes dishes every third day.

She sweeps the floor every fourth day

Today she did both

In how many days will she do both again?



This problem can be solved by finding the **Least Common Multiple (LCM)** of 3 and 4

Write the multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24, ...

Write the multiples of 4: 4, 8, 12, 16, 20, 24, 28, ...

The common multiples of 3 and 4 are 12, 24, ...

The **Least Common Multiple** is 12.

The LCM of 3 and 4 is 12.

In 12 days, Jan will have to do both chores.

EXERCISES

Copy the multiples. What is the LCM?

- | | |
|----------------------------------|------------------------------------|
| 1. 2: 2, 4, 6, 8, 10, 12, ... | 2. 5: 5, 10, 15, 20, 25, 30, ... |
| 3: 3, 6, 9, 12, 15, 18, ... | 6: 6, 12, 18, 24, 30, 36, ... |
| LCM = ■ 6 | LCM = ■ 30 |
| 3. 6: 6, 12, 18, 24, 30, 36, ... | 4. 10: 10, 20, 30, 40, 50, 60, ... |
| 8: 8, 16, 24, 32, 40, 48, ... | 15: 15, 30, 45, 60, 75, 90, ... |
| LCM = ■ 24 | LCM = ■ 30 |

Write the multiples of each number. Find the LCM

- | | | | |
|------------|----|--------------|----|
| 5. 4 and 5 | 20 | 6. 6 and 9 | 18 |
| 7. 3 and 7 | 21 | 8. 2 and 4 | 4 |
| 9. 4 and 6 | 12 | 10. 8 and 10 | 40 |

Using the Exercises

- For questions 1 to 4, students scan lists of multiples to find the LCM. Note that questions 1 and 4 show more than one common multiple.
- For questions 5 to 10, students must first list the multiples of two numbers and then find the LCM.

PRACTICE

Copy the multiples. What is the LCM?

1. 2: 2, 4, 6, 8, 10, 12, ... 2. 3: 3, 6, 9, 12, 15, 18, ...
 4: 4, 8, 12, 16, 20, 24, ... 6: 6, 12, 18, 24, 30, ...
 LCM = ■ 4 LCM = ■ 6

Write the multiples of each number. Find the LCM.

3. 9 and 12 **36** 4. 8 and 12 **24** 5. 5 and 15 **15**
 6. 5 and 7 **35** 7. 20 and 30 **60** 8. 12 and 16 **48**
 9. 4 and 7 **28** 10. 15 and 20 **60** 11. 14 and 21 **42**
 12. 3, 6, and 9 **18** 13. 2, 3, and 4 **12** 14. 2, 4, and 5 **20**
 15. 3, 5, and 6 **30** 16. 3, 4, and 6 **12** 17. 4, 6, and 9 **54**

True or false?

18. The LCM of 7 and 5 is 35 **True**
 19. The LCM of 16 and 8 is 8 **False**
 20. The LCM of 1 and 3 is 3. **True**
 21. The LCM of 4 and 8 is 32. **False**

Solve.

22. Janet cuts the lawn every 2 weeks. She washes windows every 5 weeks. How often does she do both in a week? **Every 10 weeks.**

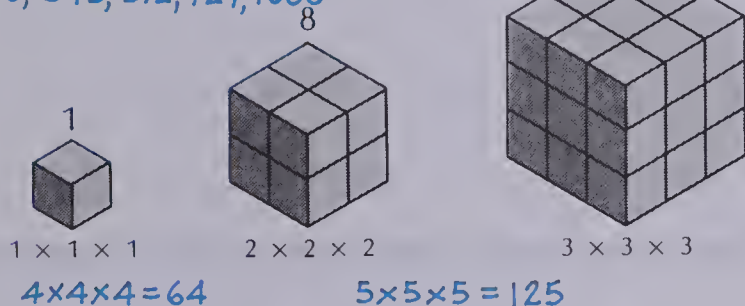
Cubic Numbers

The cubes show the first 3 cubic numbers.

Draw a picture of the next two cubic numbers.

Name the cubic numbers less than 1001.

216, 343, 512, 729, 1000



293

Assigning the Practice

Minimum: 1-14, 22

Average: 6-22

Enriched: 6-22

Reinforcement

1. Play a game with 2 or 3 dice. Each player rolls the dice and has to find the LCM of the numbers displayed.

2. Ask the students to illustrate the LCM of the following groups of two or three numbers with number lines as in the lesson.

- a. 4 and 6 b. 5 and 10
 c. 2, 4, and 6 d. 3, 6, and 8

3. Have the students find the following missing numbers.

- a. The LCM of 6 and 15 is _____.
 b. The LCM of _____ and 8 is 24.
 c. The LCM of 9 and _____ is 36.
 d. The LCM of 2, 7, and _____ is 70.

Enrichment

1. Assign *Cubic Numbers* at the bottom of page 293. Some students may wish to build them with Centicubes.

2. Have the students investigate a reason why the LCM of some sets of numbers is their product, while for others it is a half, a third, a fourth, etc. of their product. For example, the LCM of 4 and 5 is 20; yet, the LCM of 6 and 8 is 24 (half their product).

Extra Practice

Worksheet A52

Pages 292-293

Write the multiples and circle the LCM

1. 4, 8, 12, 16, 20 2. 8, 16, 24, 32, 40, 48
 6, 12, 18, 24, 30 10, 20, 30, 40, 50, 60
 3. 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
 9, 18, 27, 36, 45, 54, 63, 72, 81, 90
 4. 2, 4, 6, 8, 10, 12, 14, 16
 3, 6, 9, 12, 15, 18, 21, 24
 4, 8, 12, 16, 20, 24, 28, 32

Find the LCM

5. 4 and 5: 20 6. 4 and 7: 28 7. 6 and 8: 24

Objective A53

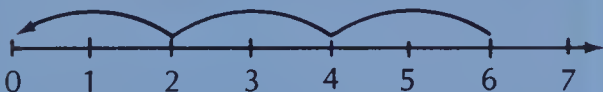
Recognize numbers divisible by 2, 5, 10, and 9.

Introducing the Lesson

Sketch the following on the chalkboard.



Ask why 6 and 8 are called *even* and why 5 and 7 are called *odd* numbers. Have someone name the first ten even numbers and then the first ten odd numbers. Use a number line to show that zero must be considered even.

**Teaching the Lesson**

Point out the divisibility rules at the top of page 294. Emphasize how important these will be for future math work. Give several examples for each rule. Test the divisibility of each example through division. If a number is evenly divisible by a certain number, the quotient has no remainder.

$$\begin{array}{r} 13 \\ 9 \overline{)117} \end{array} \quad 117 \text{ is divisible by 9.}$$

Note that all *even* numbers are divisible by 2. All even numbers ending in zero are divisible by 2, 5, and 10.

Show that if, for example, the following numbers are divisible by 5, then they must also be multiples of 5.

$$\begin{array}{r} 16 \\ 5 \overline{)80} \end{array} \quad \begin{array}{r} 21 \\ 5 \overline{)105} \end{array}$$

80 and 105 are multiples of 5 and are evenly divisible by 5.

5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105,...

Divisibility Rules

2

A number divides evenly by 2 if its last digit is 0, 2, 4, 6, or 8.

$$\begin{array}{r} 15 \\ 2 \overline{)30} \\ \underline{2} \\ 10 \\ \underline{10} \end{array}$$

5

A number divides evenly by 5 if its last digit is 0 or 5.

$$\begin{array}{r} 12 \\ 5 \overline{)60} \\ \underline{5} \\ 10 \\ \underline{10} \end{array}$$

10

A number divides evenly by 10 if its last digit is 0.

$$\begin{array}{r} 40 \\ 10 \overline{)400} \\ \underline{40} \\ 00 \\ \underline{00} \end{array}$$

9

A number divides evenly by 9 if the sum of its digits is 9 or a multiple of 9.

$$\begin{array}{r} 12 \\ 9 \overline{)108} \\ \underline{9} \\ 18 \\ \underline{18} \end{array}$$

EXERCISES

- Find the quotients of the three numbers divisible by 2.
14, 37, 96, 519, 930
 $\begin{array}{r} 7 \\ 2 \overline{)14} \end{array}$ $\begin{array}{r} 48 \\ 2 \overline{)96} \end{array}$ $\begin{array}{r} 465 \\ 2 \overline{)930} \end{array}$
- Find the quotients of the three numbers divisible by 5.
75, 200, 118, 244, 800
 $\begin{array}{r} 15 \\ 5 \overline{)75} \end{array}$ $\begin{array}{r} 40 \\ 5 \overline{)200} \end{array}$ $\begin{array}{r} 160 \\ 5 \overline{)800} \end{array}$
- Find the quotients of the three numbers divisible by 10.
55, 130, 408, 580, 900
 $\begin{array}{r} 13 \\ 10 \overline{)130} \end{array}$ $\begin{array}{r} 58 \\ 10 \overline{)580} \end{array}$ $\begin{array}{r} 90 \\ 10 \overline{)900} \end{array}$
- Find the quotients of the three numbers divisible by 9.
29, 63, 95, 117, 738
 $\begin{array}{r} 7 \\ 9 \overline{)63} \end{array}$ $\begin{array}{r} 13 \\ 9 \overline{)117} \end{array}$ $\begin{array}{r} 82 \\ 9 \overline{)738} \end{array}$

Using the Exercises

- Students must use the divisibility rules for 2, 5, 10, and 9 as they select three numbers for each question. Then they are to show the division with an even quotient as proof of divisibility.

PRACTICE

- Which numbers divide evenly by 10?
a. 25 b. 70 c. 102 d. 690 e. 2006 f. 7650
- Which numbers divide evenly by 2?
a. 23 b. 76 c. 345 d. 840 e. 3466 f. 8000
- Which numbers divide evenly by 5?
a. 40 b. 58 c. 549 d. 785 e. 4557 f. 9065
- Which numbers divide evenly by 9?
a. 72 b. 99 c. 432 d. 774 e. 701 f. 693
- Copy the chart. Write the quotients which have no remainders.

Number	Divisible by 2	Divisible by 5	Divisible by 9	Divisible by 10
7256	3628			
2425		485		
3500	1750	700		350
1134	567		126	
6000	3000	1200		600
8910	4455	1782	990	891

Invisible Divisibles

Find the invisible number in each rectangle.

- It is between 1255 and 1275. It is divisible by 2 and 5, but not by 9.

1270

- It is between 8485 and 8510. It is divisible by 2 and 9, but not by 5.

8496

295

Extra Practice

Worksheet A53

Pages 294-295

Test each number and state whether it is divisible by 2, 5, 9, or 10.
(Some questions have more than one answer.)

- 55: 5
- 63: 9
- 132: 2
- 80: 2, 5, 10
- 180: 2, 5, 9, 10
- 754: 2
- 145: 5
- 866: 2
- 766: 2
- 666: 2, 9
- 686: 2
- 882: 2, 9
- 315: 5, 9
- 1682: 2
- 1683: 9

Assigning the Practice

Minimum: 1-4

Average: 1-5

Enriched: 1-5

Reinforcement

1. Ask the students to circle the numbers below that are divisible by 5 and to put a box around the numbers divisible by 10. Then have them make a statement about the numbers enclosed by both a circle and a box.

40 35 70 150 600 225
85 9000 15 6400 195 8640

2. Give each student a 100 chart. Ask them to mark the numbers that are evenly divisible by 2 with red, by 5 with blue, by 10 with yellow, and by 9 with green. Ask "Which numbers have three different coloured marks?"

3. Ask the students to look at the Practice sections from pages 77 to 89 and to find all divisions by 2, 5, and 9 that would come out evenly.

Enrichment

1. Assign *Invisible Divisibles* at the bottom of page 295. Encourage the students to think of other invisible divisibles for the rest of the class to solve.

2. Ask the students to complete the following.

a. even even odd odd
 + even + odd + odd + even

b. even even odd odd
 × even × odd × odd × even

UNIT 13 LESSON 4

Objective A54

Find the factors of a whole number.

Introducing the Lesson

Review the inverse relationship of multiplication and division.

factor \times factor = product

factor $\overline{) \text{product}}$ or divisor $\overline{) \text{dividend}}$

Focus on the relations between the words *factor*, *divisor*, and *multiple*. From the fact $6 \times 4 = 24$ or $24 \div 6 = 4$, students should realize that:

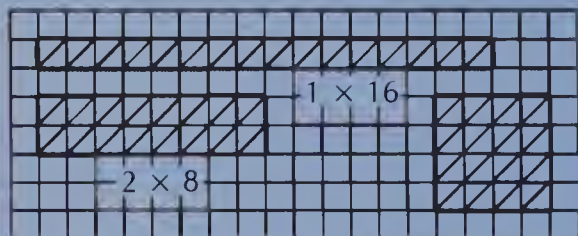
- 6 is a *factor* of 24,
- 6 is a *divisor* of 24,
- 24 is evenly *divisible* by 6,
- 24 is a *multiple* of 6.

Teaching the Lesson

Read and discuss the top of page 296. Explain that when all of the multiplications of a number are listed, all of its **factors** and **divisors** are also listed. For example, the eight factors of 24 (1, 2, 3, 4, 6, 8, 12, and 24) also divide evenly into 24. Also, 24 is a **multiple** of each of the factors.

Give each student a sheet of graph paper. Ask them to make all possible rectangles having an area of 5, 9, 20, 36, 43, and 48 squares. Discuss how this activity gives all of the multiplications for each number, and thus the factors also. For example, the factors of 16:

1, 2, 4, 8, 16

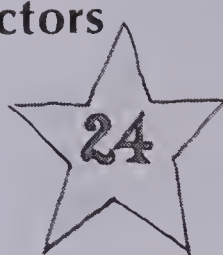


Provide practice with the divisibility rules for 2, 5, 10, and 9 to determine factors. Pose these questions.

"Is 9 a factor of 162?"

"Is 5 a factor of 552?"

Factors



Multiplications with a product of 24

$$\begin{aligned} 24 &= 1 \times 24 \\ 24 &= 2 \times 12 \\ 24 &= 3 \times 8 \\ 24 &= 4 \times 6 \end{aligned}$$

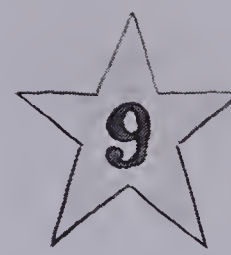
The **factors** of 24 are: 1, 2, 3, 4, 6, 8, 12, 24



Multiplications with a product of 7

$$7 = 1 \times 7$$

The **factors** of 7 are: 1, 7



Multiplications with a product of 9

$$\begin{aligned} 9 &= 1 \times 9 \\ 9 &= 3 \times 3 \end{aligned}$$

The **factors** of 9 are: 1, 3, 9

EXERCISES

Write the different multiplications for each product. List the factors.

$$\begin{aligned} 1. \quad 12 &= 1 \times 12 \\ 12 &= 2 \times 6 \\ 12 &= 3 \times 4 \end{aligned}$$

Factors of 12: 1, 2, 3, 4, 6, 12

$$\begin{aligned} 2. \quad 20 &= 1 \times 20 \\ 20 &= 2 \times 10 \\ 20 &= 4 \times 5 \end{aligned}$$

Factors of 20: 1, 2, 4, 5, 10, 20

$$\begin{aligned} 3. \quad 25 &= 1 \times 25 \\ 25 &= 5 \times 5 \end{aligned}$$

Factors of 25: 1, 5, 25

$$4. \quad 11 = 1 \times 11$$

Factors of 11: 1, 11

$$\begin{aligned} 5. \quad 30 &= 1 \times 30 \\ 30 &= 2 \times 15 \\ 30 &= 3 \times 10 \\ 30 &= 5 \times 6 \end{aligned}$$

Factors of 30: 1, 2, 3, 5, 6, 10, 15, 30

$$\begin{aligned} 6. \quad 27 &= 1 \times 27 \\ 27 &= 3 \times 9 \end{aligned}$$

Factors of 27: 1, 3, 9, 27

$$7. \quad 6 = 1 \times 6$$

$$8. \quad 8 = 1 \times 8$$

$$9. \quad 28 = 1 \times 28$$

$$10. \quad 35 = 1 \times 35$$

$$11. \quad 32 = 1 \times 32$$

$$12. \quad 53 = 1 \times 53$$

296

Using the Exercises

- Questions 1 to 6 help the students list all of the multiplications of a number and then its factors. Point out that factors are more easily used if listed clearly in numerical order.
- Questions 7 to 12 require the students to do the same as above, but no help is given. Encourage the students to use the divisibility rules for 2, 5, 10, and 9 to help them think of factors.

Practice

Write the multiplications for each product. List the factors.

1. $15 = 3 \times 5$ 2. $81 = 9 \times 9$
 $15 = 1 \times 15$ $81 = 1 \times 81$
 Factors of 15: 1, 3, 5, 15 Factors of 81: 1, 9, 81
3. 10 4. 18 5. 21 6. 13 7. 16
 8. 40 9. 1 10. 29 11. 19 12. 36
 13. 31 14. 50 15. 48 16. 17 17. 42
 18. 23 19. 100 20. 49 21. 51 22. 60

True or false? Use divisibility rules.

23. 5 is a factor of 56. **False** 24. 5 is a factor of 345. **True**
 25. 2 is a factor of 436. **True** 26. 2 is a factor of 2420. **True**
 27. 9 is a factor of 162. **True** 28. 9 is a factor of 43. **False**
 29. 10 is a factor of 3425. **False** 30. 10 is a factor of 640. **True**
 31. 18 is a factor of 126. **True** 32. 45 is a factor of 225. **True**

Review

- A51 Copy and write the next five multiples.
 1. 7, 14, 21, ... **28, 35, 42, 49, 56** 2. 60, 120, 180, ... **240, 300, 360, 420, 480** 3. 18, 21, 24, ... **27, 30, 33, 36, 39**

- A52 List the multiples. Find the LCM.
 4. 6 and 9 **36** 5. 5 and 10 **10** 6. 6 and 10 **30**

7. Copy the chart. Answer yes or no for each.

Number	Divisible by 2	Divisible by 5	Divisible by 9	Divisible by 10
7651	No	No	No	No
8340	Yes	Yes	No	Yes

- A54 List the factors.
 8. 33 **1, 3, 11, 33** 9. 37 **1, 37** 10. 70 **1, 2, 5, 7, 10, 14, 35, 70** 11. 64 **1, 2, 4, 8, 16, 32, 64**

297

Assigning the Practice

Minimum: 1-17, 23-28

Average: 8-30

Enriched: 10-32

Review Exercises

Questions	Objective	Pages
1-3	A51	290-291
4-6	A52	292-293
7	A53	294-295
8-11	A54	296-297

Reinforcement

1. Have the students play this card game. Each player draws a card from a deck that is numbered from 1 to 100. To earn a point, the player must name all factors for the number drawn. The first player with ten points wins.

2. Ask the students to make all possible rectangles having an area of 23, 100, 54, and 60. Then ask them to list all factors for 23, 100, 54, and 60.

3. Ask the students to illustrate all possible ways that 36 cookies can be evenly shared. For example, each of 9 people can have 4 cookies.

Enrichment

1. Have the students name numbers which have:

- 8 or more factors,
- 5 factors.
- 2 factors.

2. Let the students investigate a divisibility rule for determining the following.

- Is 35 a factor of 175?
- Is 84 evenly divisible by 28?
- Is 27 a factor of 243?

Extra Practice

Worksheet A54

Pages 296-297

Complete.

1. $10 = 2 \times 5$ 2. $42 = 7 \times 6$ 3. $104 = 8 \times 13$
 4. $25 = 5 \times 5$ 5. $225 = 25 \times 9$ 6. $100 = 2 \times 50$
 7. $39 = 13 \times 3$ 8. $144 = 12 \times 12$ 9. $588 = 196 \times 3$
 10. $256 = 16 \times 16$ 11. $300 = 75 \times 4$ 12. $729 = 81 \times 9$
 13. $288 = 2 \times 144 = 4 \times 72 = 3 \times 96$
 $= 12 \times 24 = 24 \times 12 = 16 \times 18$
 $= 18 \times 16 = 36 \times 8 = 72 \times 4$

UNIT 13 LESSON 5

Objective A55

Identify prime and composite numbers.

Introducing the Lesson

List the numbers from 1 to 20 on the chalkboard. Have the students name all of the factors for each number.

Circle the numbers which have only two factors. Explain that these are called **prime numbers**. Place a box around the numbers with more than two factors. Explain that these are called **composite numbers**. Point out that the number 1 is thus neither prime nor composite.

Teaching the Lesson

Read and discuss the definitions and examples at the top of page 298. Provide each student with graph paper. Ask them to experiment with areas of rectangles to prove that a prime number makes only two rectangles and that a composite number makes more than two.

Give each student a 100 chart to mark in various colours to find the 25 prime and 74 composite numbers to 100. Start by circling the first four primes: 2, 3, 5, and 7. Then the multiples of 2 (other than 2) are marked with a red diagonal line as shown in the key at the top of the 100 chart on page 298. Next the multiples of 3 are marked in blue as shown; the multiples of 5 are marked in yellow as shown; and the multiples of 7 are marked in green as shown.

Have the students count the unmarked numbers. (Do not include the number 1.) Ask, "Are these numbers prime or composite?"

Ask the students to circle all 25 primes. Explain that the prime numbers to 200 could be found in this way, but the multiples of 11 would also have to be marked.

Point out that the *prime factors* of composite numbers can easily be seen by looking at the marked 100 chart.

14: 2, 7 30: 2, 3, 5
24: 2, 3 56: 2, 7

Prime and Composite Numbers

Multiples of 2:
Multiples of 3:

Multiples of 5:
Multiples of 7:

7 is divisible only by 1 and 7.

The factors of 7 are 1 and 7.

When a number has only 2 factors, it is called a **prime number**.

20 is divisible by 1, 2, 4, 5, 10, and 20.

The factors of 20 are: 1, 2, 4, 5, 10, and 20.

When a number has more than 2 factors, it is called a **composite number**.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

EXERCISES

List the factors for each. Write prime or composite.

1. 2 **Prime** 2. 8 **Com.** 3. 14 **Com.** 4. 21 **Com.** 5. 16 **Composite**
6. 17 **Prime** 7. 5 **Prime** 8. 27 **Com.** 9. 12 **Com.** 10. 17 **Prime**

Write the prime numbers in each group.

11. 6, 7, 8 **7** 12. 2, 3, 4 **2, 3** 13. 21, 22, 23 **23**

Write the composite numbers in each group.

14. 10, 11, 12 **10, 12** 15. 19, 20, 21 **20, 21** 16. 37, 38, 39 **38, 39**

17. a. List the prime numbers less than 100. **2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97**
b. List the composite numbers up to 100.

298

Using the Exercises

- Questions 1 to 10 require the students to list all the factors of a number before stating whether it is prime or composite. This step helps the student use the definition of a prime as having only two factors.
- Questions 11 to 16 require the students to choose the prime or the composite numbers within a set of three numbers. Remind the students that 2 is the only even *prime*, therefore, all other even numbers are composite. Divisibility rules can also be used here.
- Students can use their marked 100 charts to answer question 17. There are 25 prime numbers and 74 composite numbers up to 100.

PRACTICE

List the factors for each. Write prime or composite.

1. 11 Prime 2. 15 Com. 3. 9 Com. 4. 29 Prime 5. 71 Prime
6. 25 Com. 7. 41 Prime 8. 22 Com. 9. 31 Prime 10. 34 Com.

True or false?

11. 42 is a composite number True 12. 51 is a prime number False
13. 49 is a composite number True 14. 57 is a prime number True
15. 81 is a prime number False 16. 67 is a prime number True

17. Make a chart of the numbers up to 200.

Cross out the multiples of 2, 3, 4, 7, 11, and 13.

List all the prime numbers less than 200.

How many composite numbers are there up to 200? 153

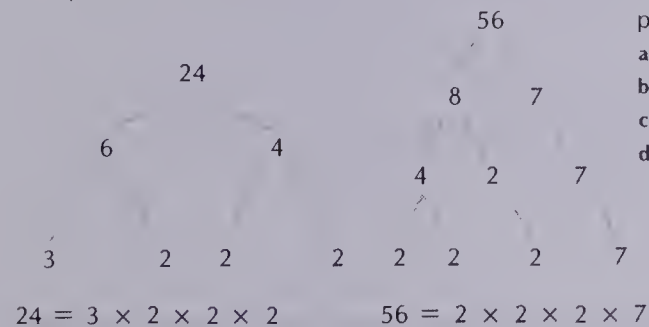
18. Is "1" prime or composite?

Read the definitions carefully. Neither

Prime Factors

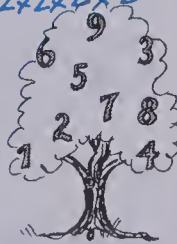
We can make a **factor tree** to write a number as the product of prime factors.

Study the examples.



Write each as the product of prime factors.

- a. 12 $2 \times 2 \times 3$
b. 32 $2 \times 2 \times 2 \times 2 \times 2$
c. 36
d. 48



- c. $2 \times 2 \times 3 \times 3$
d. $2 \times 2 \times 2 \times 2 \times 3$

299

Assigning the Practice

Minimum: 1-16

Average: 1-17

Enriched: 1-18

Reinforcement

1. Ask the students to name a divisibility rule (or rules) which proves the following numbers to be composite.

- a. 310 b. 465 c. 658
d. 612 e. 873 f. 360

2. Label a deck of cards with the numbers from 2 to 100 for students to play a variation of "Snap". Cards are placed in a pile face down. Two players take turns turning up the top card. For the number shown they call out either "prime" or "composite". The first player to answer correctly keeps the card. In case of a tie, another card is turned over. The player with the most cards at the end of the game wins.

Enrichment

1. Assign *Prime Factors* at the bottom of page 299. Point out the following definitions.

- a. the *prime factors* of 56: 2, 7
b. 56 as a *product of prime factors*:
 $2 \times 2 \times 2 \times 7$

2. Show the students how expressing a number as a *product of prime factors*, with the aid of a factor tree, can lead to naming its multiplications and factors.

$$24 = \boxed{3} \times \boxed{2 \times 2 \times 2} \rightarrow 3 \times 8$$

Extra Practice

Worksheet A55

Pages 298-299

Identify each number as prime or composite.

1. 9: Composite 2. 91: Composite 3. 403: Composite
4. 3467: Prime 5. 5: Prime 6. 53: Prime
7. 629: Composite 8. 4001: Prime 9. 209: Composite

10. List 3 numbers that have exactly 3 factors.

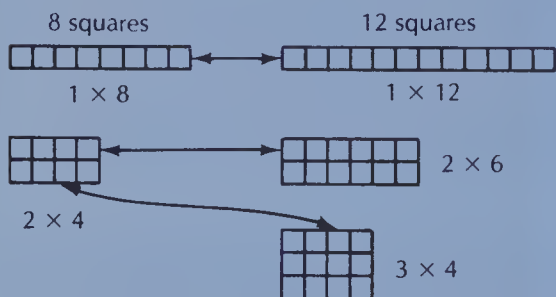
Number	Factors
<u>9</u>	<u>1</u> , <u>3</u> , <u>9</u>
<u>16</u>	<u>1</u> , <u>4</u> , <u>16</u>
<u>25</u>	<u>1</u> , <u>5</u> , <u>25</u>

Objective A56

Find the greatest common factor (GCF) of two or three numbers.

Introducing the Lesson

Give each student a sheet of graph paper. Ask the students to make all possible rectangles having areas of 8 squares and 12 squares. Ask the students to find the sides of rectangles having common lengths.



Have the students list the factors of 8 and 12 from the list of multiplications. Demonstrate that the common factors are the same as the common sides.

8: 1, 2, 4, 8
 12: 1, 2, 3, 4, 6, 12

Ask the students to find the common sides of rectangles having areas of 24 squares and 36 squares, and rectangles having areas of 21 squares and 23 squares.

Teaching the Lesson

Read the flower arranger's problem at the top of page 300. Model the possibilities with artificial roses and carnations or with chalkboard drawings.

2 bouquets:

12 roses + 16 carnations in each bouquet

4 bouquets:

6 roses + 8 carnations in each bouquet

8 bouquets:

3 roses + 4 carnations in each bouquet

Since 24 and 32 have no other common divisors or factors, the solution for the flower arranger is to have 8 bouquets. Show how this solution can be found by finding the greatest common factor (GCF) of 24 and 32.

24: 1, 2, 3, 4, 6, 8, 12, 24
 32: 1, 2, 4, 8, 16, 32
 GCF = 8

Greatest Common Factor

A flower arranger has 24 roses and 32 carnations. What is the greatest number of bouquets he can make up so that each bouquet has the same number of roses and the same number of carnations?

This problem can be solved by finding the **Greatest Common Factor (GCF)** of 24 and 32.

List the **factors** of 24: 1, 2, 3, 4, 6, 8, 12, 24

List the **factors** of 32: 1, 2, 4, 8, 16, 32

The common factors of 24 and 32 are: 1, 2, 4, and 8. The **Greatest Common Factor (GCF)** is 8.

Now we know that the florist can make 8 bouquets — with 3 roses and 4 carnations in each bouquet.



EXERCISES

Copy each list of factors. What is the GCF?

1. 10: 1, 2, 5, 10

12: 1, 2, 3, 4, 6, 12

GCF = **2**

2. 6: 1, 2, 3, 6

18: 1, 2, 3, 6, 9, 18

GCF = **6**

3. 13: 1, 13

26: 1, 2, 13, 26

GCF = **13**

4. 34: 1, 2, 17, 34

51: 1, 3, 17, 51

GCF = **17**

List the factors of each. Find the GCF.

5. 6: **1, 2, 3, 6**

8: **1, 2, 4, 8**

GCF = **2**

6. 17: **1, 17**

19: **1, 19**

GCF = **1**

7. 5 and 15 **5**

8. 20 and 24 **4**

Using the Exercises

- For questions 1 to 4, students scan lists of factors to find the LCM. Note that 1 is a common factor in all examples.
- For questions 5 to 8, students must first list the factors and then find the GCF. Point out that sometimes the GCF is 1, as in question 6.

PRACTICE

What is the GCF?

1. 9: 1, 3, 9
12: 1, 2, 3, 4, 6, 12
GCF = **3**
2. 28: 1, 2, 4, 7, 14, 28
42: 1, 2, 3, 6, 7, 14, 21, 42
GCF = **14**

List the factors of each. Find the GCF.

3. 16 and 20 **4**
4. 24 and 30 **6**
5. 32 and 40 **8**
6. 6 and 7 **1**
7. 9 and 15 **3**
8. 11 and 13 **1**
9. 14 and 28 **14**
10. 36 and 45 **9**
11. 23 and 25 **1**
12. 16 and 18 **2**
13. 26 and 39 **13**
14. 31 and 33 **1**

True or false?

15. The GCF of 10 and 20 is 10. **True**
16. The GCF of 7 and 9 is 1. **True**
17. The GCF of 3 and 21 is 1. **False**
18. The GCF of 15 and 30 is 15. **True**

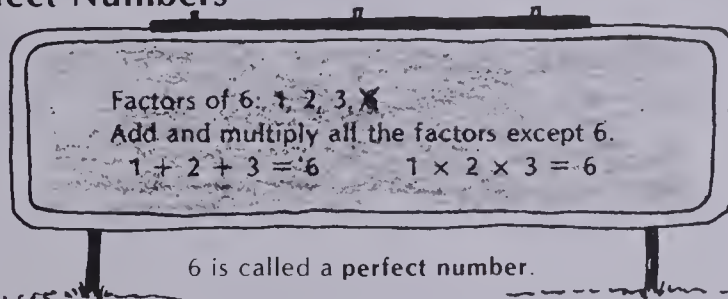
Find the GCF.

19. 12, 18, and 24 **6**
20. 25, 100, and 50 **25**
21. 36, 24, and 72 **12**
22. 6, 12, and 39 **3**
23. 10, 55, and 30 **5**
24. 7, 14, and 121 **1**

Solve

25. What is the greatest number of identical bouquets that a florist can make up from 28 roses and 20 carnations? **4**

Perfect Numbers



Can you find the next perfect number?

28

301

Assigning the Practice

Minimum: 1–11, 15–20

Average: 7–22, 25

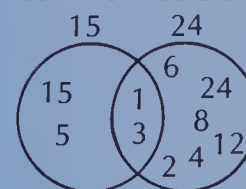
Enriched: 9–25

Reinforcement

1. Play a game with a deck of cards numbered from 2 to 100. Each player draws two or three cards and has to find the GCF of the numbers drawn.
2. Provide graph paper. Have the students illustrate the common factors and greatest common factor for questions 3, 14, 15, and 21 of the Practice section on page 301.

Enrichment

1. Assign *Perfect Numbers* at the bottom of page 301.
2. Show how Venn Diagrams (introduced in the Enrichment section on page 237 of the *Teacher's Resource Book*) can show common factors.



Common factors:
1 and 3
GCF: 3

Ask the students to draw Venn Diagrams to show common factors and the GCF for 54 and 36, 70 and 42, and 38 and 76.

3. Show the students how using factor trees to write numbers as the product of prime factors helps one to find the GCF.

GCF of 48 and 80: 16

48: $3 \times 2 \times 2 \times 2 \times 2$

80: $5 \times 2 \times 2 \times 2 \times 2$

Have the students use this method for finding the GCF for several questions in the Practice section on page 301.

4. Ask the students to explore this relationship between the LCM and the GCF of a given pair of numbers: the product of any two given numbers is always equal to the product of their LCM and GCF.

Extra Practice

Worksheet A56

Pages 300–301

Find the GCF.

1. 36 and 32: **4**
2. 84 and 63: **21**
3. 8 and 12: **4**
4. 24 and 30: **6**
5. 50 and 75: **25**
6. 48 and 72: **24**
7. 48 and 56: **8**
8. 64 and 96: **32**
9. What is the greatest number of identical Halloween bags that can be made from 56 jelly beans and 84 peanuts? **28**

Objective A57

Use the rules for order of operations to simplify number expressions.

Introducing the Lesson

Pose this problem: "Mrs. Lee paid \$5 admission to an antique show and bought 4 chairs at \$15 each. How much did she spend?" After discussing the operations needed to solve the problem, have the students think of an *expression* that describes the situation. Record the expression and point out how rules are needed for the *order* of calculation to avoid confusion.

$$5 + 4 \times 15 = 9 \times 15 \\ = 135$$

$$5 + 4 \times 15 = 5 + 60 \\ = 65$$

Pose a second problem: "The costs of a \$150 painting and a \$120 painting were equally shared by 3 people. What was each person's share?" Show that the order for calculating the solution to the expression needs to be determined.

$$150 + 120 \div 3 = 270 \div 3 \\ = 90$$

$$150 + 120 \div 3 = 150 + 40 \\ = 190$$

Teaching the Lesson

Point out the rules for order of operations at the top of page 302. After reading Rule 1 and working through the examples, explain how this rule can apply to the antique show problem above.

Multiply or divide before adding or subtracting.

$$5 + 4 \times 15 = 5 + 60 \\ = 65$$

Mrs. Lee spent \$65.

Read Rule 2 and work through the examples. Show how the problem about sharing the cost of paintings is solved using this rule.

Work inside parentheses first.

$$(150 + 120) \div 3 = 270 \div 3 \\ = 90$$

Order of Operations

We use these rules to **simplify** number expressions

Rule 1: Multiply and divide before adding and subtracting.

$$20 - 2 \times 3 = 20 - 6 \\ = 14$$

$$6 \div 2 + 3 \times 5 = 3 + 15 \\ = 18$$

Rule 2: Do the work inside the parentheses first.

$$5 \times 2 + 3 = 10 + 3 \\ = 13$$

$$5 \times (2 + 3) = 5 \times 5 \\ = 25$$

EXERCISES

Use Rule 1 to evaluate the expression.

$$1. \quad 16 \div 2 + 4 = \blacksquare \quad 8 \quad 4 \\ = \blacksquare \quad 12$$

$$2. \quad 5 + 4 \times 7 = 5 + \blacksquare \quad 28 \\ = \blacksquare \quad 33$$

$$3. \quad 10 \div 2 - 2 \times 2 = \blacksquare \quad 5 \quad 4 \\ = \blacksquare \quad 1$$

$$4. \quad 3 \times 8 - 9 \div 3 = \blacksquare \quad 24 \quad 3 \\ = \blacksquare \quad 21$$

$$5. \quad 19 + 5 \times 7 \quad 54$$

$$6. \quad 8 \times 6 - 4 \times 2 \quad 40$$

$$7. \quad 6 \times 9 + 5 \div 5 \quad 55$$

$$8. \quad 100 - 19 \times 2 \quad 62$$

Use Rule 2 to evaluate the expression.

$$9. \quad (7 - 2) \times 4 = \blacksquare \quad 5 \quad 4 \\ = \blacksquare \quad 20$$

$$10. \quad 7 - (5 - 3) = 7 - \blacksquare \quad 2 \\ = \blacksquare \quad 5$$

$$11. \quad 28 \div (3 + 1) = 28 \div \blacksquare \quad 4 \\ = \blacksquare \quad 7$$

$$12. \quad 15 \times (10 - 8) = 15 \times \blacksquare \quad 2 \\ = \blacksquare \quad 30$$

$$13. \quad 10 - (4 \times 2) \quad 2$$

$$14. \quad (2 + 4) \times 5 + 2 \quad 32$$

$$15. \quad 35 \div (3 + 2) + 12 \quad 19$$

$$16. \quad 7 \times (6 + 4) - 15 \quad 55$$

302

Using the Exercises

- Questions 1 to 8 require Rule 1 to be evaluated. The first four problems of the set give the students help in getting started. See that the students record the work as shown.
- Questions 9 to 16 require Rule 2 to be evaluated.

PRACTICE

Use Rule 1 to evaluate the expression.

1. $28 \div 7 + 35$ **39**
2. $43 + 9 \times 8$ **115**
3. $15 + 20 + 8$ **43**
4. $8 \times 4 + 3 \times 3$ **41**
5. $7 \times 5 - 6 \div 2$ **32**
6. $57 - 50 \div 2$ **32**
7. $34 + 60 \div 2$ **64**
8. $16 \div 4 - 21 \div 7$ **1**
9. $30 \div 5 + 6 \times 2$ **18**

Use Rule 2 to evaluate the expression.

10. $6 + (15 - 9)$ **12**
11. $15 + (12 \div 2)$ **21**
12. $23 - (19 - 7)$ **11**
13. $12 \times (8 + 4)$ **144**
14. $(42 \div 3) + 35$ **49**
15. $26 \times (39 - 31)$ **208**
16. $5 \times (2 + 3) - 4$ **21**
17. $30 \div (10 - 4) + 7$ **12**
18. $(10 - 4) \times 25$ **150**

Evaluate the expression using the order of operations.

19. $56 \div 8 - 2$ **5**
20. $71 + (117 \div 9)$ **84**
21. $(14 - 3) \times 2 + 1$ **23**
22. $79 + 49 \div 7$ **86**
23. $6 \times 2 - 8 \div 2$ **8**
24. $45 - (9 \div 3)$ **42**
25. $(45 + 25) \div 7 - 10$ **0**
26. $10 + (49 \div 7) \div 7 + 23$ **34**

Write an expression to solve each problem.

27. The Reinhart family is moving. They have 64 large boxes and they have rented a van that can carry 8 boxes at a time. They also have 2 full loads of odds and ends. How many full loads do they have for the van?
 $64 \div 8 + 2 = 10$

28. A warehouse forklift can carry 3 crates at a time. Five delivery trucks are lined up outside and each truck is carrying 24 crates. How many trips will be needed to unload all the trucks?

$5 \times 24 \div 3 = 40$

USING THE CALCULATOR

Use the order of operations and a calculator to solve each.

- a. $5548 \div 98 + 794$
- b. $8523 + (3936 \div 32)$ **8646**
- c. $(6000 - 947) \times 859$
- d. $437 + 7980 \div 84$ **532**
- e. $3749 \times (6512 - 908)$
- f. $10\,010 - 4032 \div 112$ **9974**
- g. $9001 - 57 \times 85$
- h. $1652 \times (685 + 967)$ **2 729 104**

a. 850.612

c. 4 340 527

e. 21 009 396

g. 4156

303

Extra Practice

Worksheet A57

Pages 302-303

Calculate.

1. $567 - 276 + 243 =$ **534**
2. $872 + 503 - 469 =$ **906**
3. $4860 \div 36 \times 15 =$ **2025**
4. $568 \times 96 \div 24 =$ **2272**
5. $475 + 45 \times 27 =$ **1690**
6. $2106 \div 27 + 676 =$ **754**
7. $305 \times (92 - 88) =$ **1220**
8. $400 \div (6 + 4) =$ **40**
9. $8 \times (3 + 5) \div 4 =$ **16**
10. $14 - (20 - 13) =$ **7**
11. $6 \times (48 \div 3) - 6 =$ **90**
12. $28 + 46 \times 23 =$ **1086**
13. $66 - 25 \div 5 =$ **61**
14. $85 - 5 \times 17 =$ **0**

Assigning the Practice

Minimum: 1-24

Average: 1-27

Enriched: 1-28

Reinforcement

1. Assign *Using the Calculator* at the bottom of page 303. Discuss how most calculators have the order of operations rules programmed into them. If possible, have the students test various kinds of calculators for this feature.

2. Have the students write an expression for the following word problems and then solve them using the two order of operations rules.

a. What is the total cost of a loaf of bread at \$1.39 and 2 dozen eggs at \$1.29 per dozen?

b. John's aunt paid him \$0.25 for each kilometre he walked for a charity drive. His neighbour paid him \$0.15. How much money did John receive from his aunt and his neighbour for the charity when he walked 21 km?

c. What is the perimeter of a seven-sided shape that has three sides which are 9 cm and four sides which are 6 cm?

d. Nancy received \$10 per week allowance. From that she spent \$6 on bus fare each week. How much money could she save after 8 weeks?

3. Have the students match the equal expressions in columns A and B.

A	B
$32 \div (7 + 9)$	$100 \div 2 \times 5$
$36 + 4 \times 12$	$(36 - 22) \times 3$
$25 \times (37 - 27)$	$29 - 81 \div 3$
$10 + (128 \div 2) \div 2$	$52 + 8 \times 4$

Enrichment

Remind the students that division can also be written in fraction form. Have them simplify these expressions using the two order-of-operations rules.

a. $45 - \frac{15}{3} + 6 \times 2$

b. $\frac{40}{5} - \left(10 - \frac{5}{1}\right)$

c. $\frac{24}{6} \times \left(\frac{10}{5} + 3\right)$

Objective A58

Use the commutative, associative, and distributive properties to simplify calculations.

Introducing the Lesson

Ask the students to study several examples like the following and make a statement about them.

$4 + 7$	$7 + 4$	$8 - 5$	$5 - 8$
6×8	8×6	$15 \div 3$	$3 \div 15$

Students should conclude that the order can be changed in multiplication and addition without affecting the result (commutative property). Have them study and make a statement about these problems.

$(24 + 8) + 15$	$24 + (8 + 15)$
$(9 - 1) - 3$	$9 - (1 - 3)$
$(8 \times 6) \times 2$	$8 \times (6 \times 2)$
$(50 \div 10) \div 5$	$50 \div (10 \div 5)$

Students should conclude that the grouping in addition and multiplication can be changed without affecting the result (the associative property).

Let the students see that a number can be rewritten as a sum or as a difference without affecting the result (the distributive property).

$$4 \times 94 = 4 \times (90 + 4) = (4 \times 90) + 4 \times 4$$

or

$$4 \times 94 = 4 \times (100 - 6) = (4 \times 100) - 4 \times 6$$

Teaching the Lesson

Point out the calculations at the top of page 304. Explain that the properties reviewed earlier make calculating easier. Work through the first two examples together. Point out that the order was changed so that the calculations resulting in 100 could be grouped together. Stress how looking for 10s and 100s is helpful when adding and multiplying.

Work through the third and fourth examples together to show how a number can be rewritten as a sum or difference to aid calculating. Provide several other chalkboard examples so the students can use the *special properties* to make calculation easier.

Special Properties

Special properties make calculating easier.

We can add or multiply in any order.

$$\begin{array}{r} 100 + 46 \\ + 46 + \end{array} = 146$$

$$\begin{array}{r} 100 \times 30 \\ \times 30 \times \end{array} = 3000$$

We can rewrite a number as a sum or difference.

$$\begin{aligned} 8 \times 73 &= 584 \\ 8 \times (70 + 3) &= 8 \times 70 + 8 \times 3 \\ &= 560 + 24 \\ &= 584 \end{aligned}$$

$$\begin{aligned} 9 \times 99 &= 891 \\ 9 \times (100 - 1) &= 9 \times 100 - 9 \times 1 \\ &= 900 - 9 \\ &= 891 \end{aligned}$$

EXERCISES

Calculate using the special properties.

1. $29 + 32 + 71 = \blacksquare 132$

2. $6 \times 7 \times 5 = \blacksquare 210$

$$100 + 32$$

$$30 \times 7$$

3. $39 + 16 + 84 = \blacksquare 139$

4. $9 \times 8 \times 5 = \blacksquare 360$

$$39 + 100$$

$$9 \times 40$$

5. $15 + 48 + 85 = 148$

6. $45 + 19 + 55 = 119$

7. $25 \times 37 \times 4 = 3700$

8. $15 \times 9 \times 2 = 270$

9. $9 + 191 + 56 = 256$

10. $2 \times 15 \times 8 = 240$

11. $4 \times 86 = \blacksquare 344$

12. $7 \times 68 = 476$

$$\begin{aligned} 4 \times 80 + 4 \times 6 \\ = 320 + 24 \end{aligned}$$

13. $9 \times 35 = 315$

14. $7 \times 98 = 686$

15. $4 \times 88 = 352$

304

Using the Exercises

- Questions 1 to 10 require the students to change the order and regroup as they look for multiples of 10 and 100 to make their calculations easier. The first four questions help the students get started by showing the multiple of 10 or 100 that can be found.
- Questions 11 to 15 involve multiplications that can be calculated more easily when they are rewritten as a sum or difference. Work a few of these together until the students gain understanding.

PRACTICE

Calculate using the special properties.

1. $17 + 29 + 83 = 129$
2. $4 \times 9 \times 5 = 180$
3. $20 \times 37 \times 5 = 3700$
4. $214 + 87 + 86 = 387$
5. $62 + 95 + 38 = 195$
6. $4 \times 7 \times 50 = 1400$
7. $14 + 75 + 25 = 114$
8. $2 \times 5 \times 9 = 90$
9. $4 \times 15 \times 6 = 360$
10. $47 + 98 + 102 = 247$
11. $29 + 183 + 17 = 229$
12. $9 \times 4 \times 25 = 900$
13. $8 \times 97 = 776$
14. $3 \times 92 = 276$
15. $6 \times 18 = 108$
16. $5 \times 73 = 365$
17. $4 \times 57 = 228$
18. $9 \times 71 = 639$
19. $7 \times 57 = 399$
20. $2 \times 94 = 188$

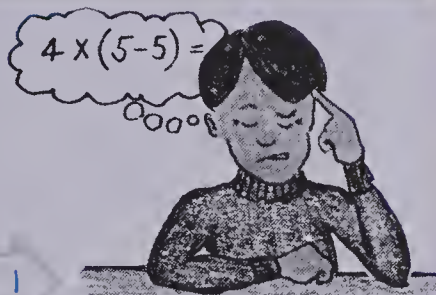
Calculate.

21. $3 \times 89 + 7 \times 89 = 890$
22. $127 \times 12 - 127 \times 2 = 1270$
23. $4 \times 125 = 500$
24. $8 \times 43 + 8 \times 7 = 400$
25. $86 \times 5 + 14 \times 5 = 500$
26. $59 + 63 + 41 - 13 = 150$
27. $45 + 17 + 55 + 26 + 83 + 74 = 300$

Zero and One

Calculate the answer mentally.
Write only the answer.

- a. $4 \times (5 - 5) = \blacksquare \bigcirc$
- b. $0 + 7 \div 7 = \blacksquare \mid$
- c. $(1 \times 1) - (1 \times 0) = \blacksquare \mid$
- d. $12 \times (12 - 12) = \blacksquare \bigcirc$
- e. $(16 + 29) \times 0 = \blacksquare \bigcirc$
- f. $(4 \div 4) \times (6 \div 6) = \blacksquare \mid$



305

Assigning the Practice

Minimum: even numbers

Average: 6-26

Enriched: 7-27

Reinforcement

1. Assign *Zero and One* at the bottom of page 305. When finished, have the students complete and make a statement about the following. (A represents any counting number.)

- a. $A + 1 = \underline{\hspace{2cm}}$
- b. $A - 1 = \underline{\hspace{2cm}}$
- c. $A \times 1 = \underline{\hspace{2cm}}$
- d. $A \div 1 = \underline{\hspace{2cm}}$
- e. $A + 0 = \underline{\hspace{2cm}}$
- f. $A - 0 = \underline{\hspace{2cm}}$
- g. $A \times 0 = \underline{\hspace{2cm}}$
- h. $0 \div A = \underline{\hspace{2cm}}$

(Note: $A \div 0$ is not possible.)

2. Refer the students to the bottom of pages 61 and 63. Ask them to describe the special properties used on both pages.

3. Have the students complete the equations.

- a. $9 \times (\square - \square) = (9 \times 90) - (9 \times 1)$
- b. $86 + (\square + \square) = (86 + 14) + 37$
- c. $4 \times (\square + \square) = (4 \times 20) + (4 \times 7)$
- d. $G + H = H + \square$
- e. $(\square \times 4) \times 6 = 25 \times (4 \times \square)$
- f. $11 \times 10 = 10 \times \square$
- g. $(F + G) + H = \square + (G + H)$
- h. $B \times (A + C) = (B \times \square) + (B \times \square)$

4. Encourage the students to look for 10s and 100s to make calculating easier.

- a. $8 \times 47 \times 25 \times 4 = \square$
- b. $6 \times 2 \times 5 \times 30 \times 10 = \square$
- c. $16 + 37 + 8 + 14 + 12 + 13 = \square$
- d. $250 \times 4 \times 2 = \square$

Enrichment

Ask the students to write and then evaluate the following expressions.

1. 6 times the difference between 6 and 4
2. 18 plus the sum of 42 and 58
3. 9 times the sum of 4 and 3
4. the product of 5 and 100 minus the product of 5 and 1
5. 13 times the product of 8 and 25
6. the product of 8 and 70 plus the product of 8 and 2

Extra Practice

Worksheet A58

Pages 304-305

Calculate.

1. $25 \times 49 \times 12 = 14700$
2. $75 \times 87 \times 16 = 104400$
3. $574 + 837 + 426 = 1837$
4. $936 + 382 + 418 = 1736$
5. $9 \times 75 + 9 \times 25 = 900$
6. $86 \times 32 + 14 \times 32 = 3200$
7. $50 \times 67 \times 14 = 46900$
8. $132 + 989 - 32 = 1089$
9. $789 + 465 + 535 = 1789$
10. $57 \times 73 + 43 \times 73 = 7300$
11. $6 \times 98 = 588$
12. $13 \times 51 = 663$
13. $69 \times 9 = 621$
14. $57 \times 21 = 1197$
15. $499 \times 3 = 1497$
16. $101 \times 27 = 2727$

Objective N22

Read and write Roman numerals.

Introducing the Lesson

Write IV, VIII, and XII on the chalkboard. Ask the students to mention where one might see numerals such as these today (clocks, chapter numbers in books, outlines, cornerstones of old buildings). Recall that these are Roman numerals. Ask the students to name ways in which the Roman numeral system differs from ours. Use the numerals written on the chalkboard as you point out that the Roman system does not have place value as our system does.

Teaching the Lesson

Have the students name the previously learned Roman numerals, I, V, X, L, and C. Write these symbols on the chalkboard. Discuss how some of these symbols might have come to be used (finger for 1; "V" shape between thumb and fingers for 5; crossed hands or arms for 10). Introduce the symbols D (500) and M (1000). Read and discuss the top of page 306. Then ask the students to write several numbers in Roman numerals and then to write Roman numerals in standard form. Use the Exercises on page 306. As this is done, point out how the Roman system relies heavily on repetition, addition, and subtraction for writing numerals.

a. Repetition

3 = III 202 = CCII 3500 = MMMD
Never repeat a numeral more than three times.

b. Addition

216 = C + C + X + V + I = CCXVI
702 = D + C + C + I + I = DCCII
2621 = M + M + D + C + X + X + I
= MMDCXXI

If a larger numeral is first, add.

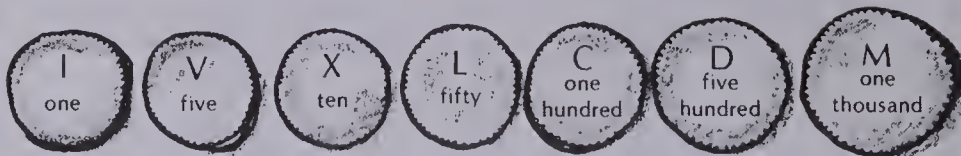
c. Subtraction

XL = 10 from 50 = 40
CM = C from M = 900

If a smaller numeral is first, subtract.

Roman Numerals

The Romans used these numerals to write numbers.



If a larger numeral is first, add.

If a smaller numeral is first, subtract.

6 = VI	V + I	4 = IV	I from V
11 = XI	X + I	9 = IX	I from X
61 = LXI	L + X + I	40 = XL	X from L
110 = CX	C + X	90 = XC	X from C
701 = DCCI	D + C + C + I	400 = CD	C from D
2155 = MMCLV	M + M + C + L + V	900 = CM	C from M

Never use the same letter (numeral) more than three times in a row.

EXERCISES

Write each numeral in standard form.

1. V 5	2. VI 6	3. VII 7	4. VIII 8	5. IV 4
6. X 10	7. XI 11	8. XII 12	9. XIII 13	10. IX 9
11. XX 20	12. XXI 21	13. XXII 22	14. XXIII 23	15. XXIV 24
16. XV 15	17. XVI 16	18. XVII 17	19. XVIII 18	20. XIX 19
21. L 50	22. LX 60	23. LXX 70	24. LXXX 80	25. XL 40
26. C 100	27. XC 90	28. CX 110	29. CXC 190	30. CCX 210
31. D 500	32. CD 400	33. DC 600	34. DCC 700	35. DCCC 800
36. M 1000	37. CM 900	38. MC 1100	39. MCC 1200	40. MCCC 1300
41. II 2	42. XVII 17	43. XXIV 24	44. LIX 59	45. LXXXV 85
46. CCLII 252	47. MCM 1900	48. MLIX 1059	49. MXCI 1091	50. CMXLIV 944

Write Roman numerals.

51. 3 III	52. 8 VIII	53. 15 XV	54. 9 IX	55. 14 XIV
56. 18 XVIII	57. 33 XXXIII	58. 42 XLII	59. 76 LXXVI	60. 94 XCIV
61. 183	62. 647	63. 2153	64. 4290	65. 8429

306

CLXXXIII DCXLVII MMCLIII MVECXC MMMCXXXIX

Using the Exercises

- Most of questions 1 to 63 should be used in an oral guided lesson. Discuss the repetitive, additive, and subtractive features of the Roman numeral system. For the larger numbers, point out how they can be thought of in parts: thousands, hundreds, tens, and ones.

$$\text{MCMXLIV} = \frac{\text{M}}{1000\text{s}} + \frac{\text{CM}}{100\text{s}} + \frac{\text{XL}}{10\text{s}} + \frac{\text{IV}}{1\text{s}}$$

- For questions 64 and 65, the Roman numeral for 5000 is $\overline{\text{V}}$ (10 000 is $\overline{\text{X}}$; 100 000 is $\overline{\text{C}}$; 1 000 000 is $\overline{\text{M}}$). Challenge the students to use the library to discover this information (or provide it yourself) so that numbers 4000 and larger can be written.

PRACTICE

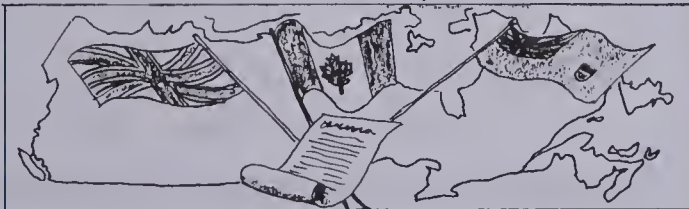
- Count from 1 to 10 in Roman numerals.
I, II, III, IV, V, VI, VII, VIII, IX, X
- Count from 90 to 100 in Roman numerals.
XC, XCI, XCII, XCIII, XCIV, XCV, XCVI, XCVII, XCVIII, CXIX, C
- Count by 5s from 5 to 50 in Roman numerals.
V, X, XV, XX, XXV, XXX, XXXV, XL, XLV, L
- Count by 10s from 10 to 110 in Roman numerals.
X, XX, XXX, XL, L, LX, LXX, LXXX, XC, C, CX
- Count by 100s from 100 to 1000 in Roman numerals.
C, CC, CCC, CD, D, DC, DCC, DCCC, CM, M
- Count by 500s from 500 to 5500 in Roman numerals.
D, M, MD, MM, MMD, MMM, MMMD, MV, MVD, V
- Write the numerals in order from smallest to largest to find the name of a famous Roman. *JULIUS CAESAR*



Important Dates

Rewrite each numeral in standard form. You will find important dates in Canada's history.

- MDCCCLXVII *1867*
- MDCVIII *1608*
- MCDXCVII *1497*



307

Assigning the Practice

Minimum: 1-5
Average: 2-5, 7
Enriched: 2-7

Reinforcement

- Have the students select a grocery advertisement from a newspaper and rewrite the ad using Roman numerals in place of standard form numerals.
- Ask the students to make a calendar for the current month using Roman numerals.

Enrichment

- Assign *Important Dates* at the bottom of page 307. Ask the students to tell why these are important years in Canada's history.
- Have the students research the Roman calendar and make a bulletin board display of their findings.
- Ask the students to research the year their house or apartment building was built and write it in Roman numerals.
- Pose the joking question, "What is half of a Roman twelve?"

Answer: 7 *X+II+I*

Extra Practice

Write in standard form.

- XXIV = *24*
- XLVIII = *48*
- LXXI = *71*
- XCV = *95*
- CCCII = *302*
- CDXCIX = *499*
- DCVII = *607*
- CMXLIV = *944*

Put the numerals in order from smallest to largest.

- XL XC XX LX II *II XX XL LX C*
- CVII CDIV CMXV CCCI DCIX *CVII CCCI CDIV DCIX CMXV*

11. Copy and complete the table.

Standard Form	Expanded Form	Roman Numeral
33	<i>30+3</i>	<i>XXXIII</i>
102	<i>100+2</i>	<i>CII</i>
249	<i>200+40+9</i>	<i>CCXLIX</i>
546	<i>500+40+6</i>	<i>DXLVI</i>
905	<i>900+5</i>	<i>CMV</i>
2378	<i>2000+300+70+8</i>	<i>MMCCCLXXVIII</i>

Worksheet N22

Pages 306-307

Objective PS13

Solve problems involving factors and multiples.

Introducing the Lesson

Review factors and multiples with the following kinds of questions.

“What are the first 8 multiples of 3?

Of what numbers is 16 a multiple?

Name the factors of 30.

Factor 48.”

Teaching the Lesson

Read the problem at the top of page 308. Work each problem-solving step together.

a. Identify

Recall that area involves factors and multiplication, while perimeter involves addends and addition.

b. Decide

The students should discover that it would be easiest to find the possible lengths of the sides through factoring 12 (the area).

c. Evaluate

Make sketches of the possible lengths and widths for rectangles with an area of 12 cm^2 . Point out the helpfulness of keeping the possibilities recorded in table form. Explain how only one of the possibilities for the lengths of the sides has a perimeter of 14.

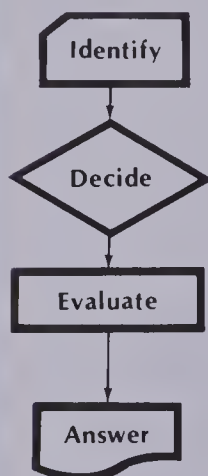
d. Answer

Reread the problem and have the students answer it.

Apply the four problem-solving steps to this problem. “What is the greatest number of identical corsages that can be made from 36 daisies and 54 chrysanthemums?” In the decide step, the students should see that factoring 36 and 54 would solve the problem. After a table of possibilities is made in the evaluate step, the students should see that the GCF of 36 and 54 (or 18) is the answer.

Problem Solving

A rectangle has an area of 12 cm^2 and a perimeter of 14 cm. What are the lengths of its sides?



area of 12 cm^2
perimeter of 14 cm

Factor 12 and test the perimeter for each pair of factors.

$$1 \times 12 = 12$$

$$2 \times 6 = 12$$

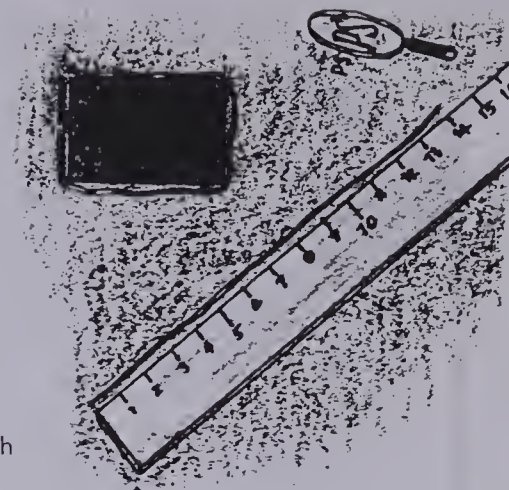
$$3 \times 4 = 12$$

$$1 + 1 + 12 + 12 = 26$$

$$2 + 2 + 6 + 6 = 16$$

$$3 + 3 + 4 + 4 = 14$$

The lengths of the sides are 3 cm and 4 cm.



EXERCISES

Solve. Use the divisibility rules.

1. A rectangle has an area of 12 cm^2 and a perimeter of 26 cm. Find the lengths of its sides. **12 cm and 1 cm**
2. A rectangle has an area of 24 cm^2 and a perimeter of 22 cm. Find the lengths of its sides. **8 cm and 3 cm**
3. What two numbers have a product of 24 and a sum of 11? **8 and 3**
4. What two numbers have a product of 36 and a sum of 20? **18 and 2**

308

Using the Exercises

- Questions 1 and 3 can be worked together. Then questions 2 and 4, which have similar solutions, can be worked independently.

PRACTICE

Solve.

- A floor covering has an area of 18 cm^2 and a perimeter of 18 cm . Find the lengths of its sides. **6 cm and 3 cm**
- What two numbers have a sum of 8 and a product of 15? **5 and 3**
- What two numbers have a product of 96 and a sum of 20? **12 and 8**
- A swimming pool has an area of 108 m^2 . What are the length and width of the rectangular pool if its perimeter is 42 m ? **12 cm and 9 cm**
- A group of students are to share equally 45 cookies and 84 carrot sticks. How many cookies and carrot sticks does each student get? (Hint! Factor 45 and 84 to find how many students there are.) **15, 28**
- A classroom has 15 dictionaries and 10 atlases. How can the teacher divide the class of 30 into groups so that each group has the same number of each book? **5 groups of 6**

REVIEW

- A55** 1. Write the prime numbers between 4 and 14. **5, 7, 11, 13**
 2. Write the composite numbers between 13 and 23. **14, 15, 16, 18, 20, 21, 22**
- A56** List the factors for each. Find the GCF.
 3. 12 and 18 **6** 4. 20 and 28 **4** 5. 18 and 30 **6**
- A57** Simplify.
 6. $23 - (6 \times 2)$ **11** 7. $15 \times 3 - 2$ **43** 8. $16 \div (4 + 4)$ **2**
- A58** Write the answer. **161**
 9. $32 + 54 + 68$ **154** 10. $(13 \times 5) \times 4$ **260** 11. $(7 \times 20) + (7 \times 3)$
- N22** Write the standard numeral. **824**
 12. VII **7** 13. XIX **19** 14. DCCCXXIV **824** 15. MXLIX **1049**

309

Assigning the Practice

Minimum: 1-4

Average: 1-5

Enriched: 1-6

Review Exercises

Questions	Objective	Pages
1-2	A55	298-299
3-5	A56	300-301
6-8	A57	302-303
9-11	A58	304-305
12-15	N22	306-307

Reinforcement

Ask the students to complete the following chart of rectangle dimensions.

Length	Width	Area	Perimeter
6 cm	9 cm		
	7 cm	28 cm^2	
7 m	25 m		
		32 cm^2	24 cm
	15 m	90 m^2	
12 cm	10 cm		
		63 cm^2	32 cm
		60 m^2	34 m
	9 cm	117 cm^2	
		20 cm^2	18 m

Enrichment

Give the students a sheet of graph paper.

1. Draw all possible rectangles with a perimeter of 36. Which rectangle has the greatest area? the least?

Is there a rectangle having the same area and perimeter?

2. Draw all possible rectangles with an area of 36 squares. Which rectangle has the greatest perimeter? the least perimeter?

Extra Practice

Worksheet PS13

Pages 308-309

- The area of the playground is 1600 m^2 . What are its dimensions?
 a. 160 m by 100 m b. **32 m by 50 m**
 c. 40 cm by 40 cm d. 80 m by 2 m
- The corner store sold 36 colouring books to a group of children. If each child bought the same number of books, how many children were there?
 a. 5 b. 20 c. 8 d. **12**
- Gloria's Grocery Store sells cans of apple juice in packages of 6. How many cans might be sold in a day?
 a. 80 b. **144** c. 148 d. 602

Problem Solving Activities

Assign Level 5, Unit 13.

Unit 13 Objective	Test Questions	Pages
A51	1-3	290-291
A52	4-6	292-293
A53	7	294-295
A54	8-10	296-297
A55	11-12	298-299
A56	13-15	300-301
A57	16-18	302-303
A58	19-21	304-305
N22	22-24	306-307
PS	25	

TEST

UNIT 13

Copy and write the next five multiples.

1. 6, 12, 18, ... 24, 30, 36, 42, 48 2. 9, 18, 27, ... 36, 45, 54, 63, 72 3. 24, 28, 32, ... 36, 40, 44, 48, 52

List the multiples of each. Find the LCM.

4. 6 and 8 24 5. 4 and 6 12 6. 5 and 7 35

7. Copy the chart. Write the quotients which have no remainder.

Number	Divisible by 2	Divisible by 5	Divisible by 9	Divisible by 10
4176	<u>2088</u>		<u>464</u>	
5040	<u>2520</u>	<u>1008</u>	<u>560</u>	<u>504</u>
1215		<u>243</u>	<u>135</u>	

List the factors.

8. 18 1, 2, 3, 6, 9, 18 9. 36 1, 2, 3, 4, 6, 9, 12, 18, 36 10. 41 1, 41

11. Write the prime numbers between 15 and 24. 17, 19, 23

12. Write the composite numbers between 2 and 13. 4, 6, 8, 9, 10, 12

List the factors of each. Find the GCF.

13. 9 and 18 GCF: 9 14. 27 and 36 GCF: 9 15. 14 and 15 GCF: 1
9: 1, 3, 9 27: 1, 3, 9, 27 14: 1, 2, 7, 14
18: 1, 2, 3, 6, 9, 18 36: 1, 2, 3, 4, 6, 9, 12, 18, 36 15: 1, 3, 5, 15

Evaluate.

16. $57 - (6 + 4)$ 47 17. $22 \times 6 - 5$ 127 18. $38 \div (8 - 6)$ 19

Calculate mentally. Write the answer.

19. $65 + 28 + 35$ 128 20. $(39 \times 4) \times 25$ 3900 21. 3×93 279

Write the number in Roman numerals.

22. 67 LXVII 23. 790 DCCXC 24. 1048 MXLVIII

Solve.

25. From the numbers below, decide which amount of nickels 9 people can share evenly.

- a. 135 b. 418 c. 726

310

Post-test

Unit 13

Write the next three multiples.

1. 8, 16, 24, 32, 40, 48 2. 24, 30, 36, 42, 48, 54 3. 35, 42, 49, 56, 63, 70

List the multiples of each. Find the LCM.

4. 9 and 12 LCM: 36 5. 6 and 5 LCM: 30 6. 12 and 16 LCM: 48
9: 9, 18, 27, 36 6: 6, 12, 18, 24, 30 12: 12, 24, 36, 48
12: 12, 24, 36 5: 5, 10, 15, 20, 25, 30 16: 16, 32, 48

7. Write the quotients which have no remainder.

Number	Divisible by 2	Divisible by 5	Divisible by 9	Divisible by 10
9338	<u>4669</u>			
1161			<u>129</u>	
4500	<u>2250</u>	<u>900</u>	<u>500</u>	<u>450</u>

List the factors.

8. 30 1, 2, 3, 5, 6, 10, 15, 30 9. 56 1, 2, 4, 7, 8, 14, 28, 56 10. 47 1, 47

MEASUREMENT

- Jake had scores of 157, 233, and 204 in a bowling tournament. What was his average score? **198**
- The lengths of the Great Lakes are 560 km, 490 km, 386 km, 330 km, and 309 km. What is the average length? **415 km**

Add or subtract.

- $\begin{array}{r} \$16.34 \\ + 28.79 \\ \hline \$45.13 \end{array}$
- $\begin{array}{r} \$20.57 \\ + 9.64 \\ \hline \$30.21 \end{array}$
- $\begin{array}{r} \$48.03 \\ - 9.15 \\ \hline \$38.88 \end{array}$
- $\begin{array}{r} \$10.90 \\ + 30.26 \\ \hline \$41.16 \end{array}$
- $\begin{array}{r} \$60.00 \\ - 25.98 \\ \hline \$34.02 \end{array}$

List the coins and bills you would give as change.

- Had: \$15.00
Spent: \$13.25
3 quarters
1 dollar
- Had: \$5.00
Spent: \$2.37
3 pennies
1 dime
- Had: \$20.00
Spent: \$11.95
2 quarters
2 dollars
- Had: \$20.00
Spent: \$11.95
1 nickel
3 dollar bills
1 5 dollar bill

- An Air Canada timetable showed the following departure and arrival times.

Vancouver to Calgary	11:30 — 13:45
Winnipeg to Toronto	12:15 — 15:25
Regina to Montreal	09:25 — 17:30

How long is each flight?
2 h 15 min
3 h 10 min
8 h 5 min

- Copy and complete the chart.

Scale	Length in Drawing	Real Length
1 cm = 3 m	6 cm	18 m
1 cm = 3 m	5 cm	15 m
1 cm = 5 km	3 cm	15 km
1 cm = 5 km	8 cm	40 km
1 cm = 10 m	10 cm	100 m
1 cm = 10 m	15 cm	150 m

311

- What are the prime numbers between 9 and 20? **11, 13, 17, 19**
- What are the composite numbers between 11 and 23? **12, 14, 15, 16, 18, 20, 21, 22**

List the factors of each. Find the GCF.

- 15 and 24 **3**
- 30 and 45 **15**
- 20 and 21 **1**

Evaluate.

- $26 - (8 + 9)$ **9**
- $92 + 15 \div 3$ **97**
- $9 \times 2 + 40 \div 8$ **23**

Calculate mentally. Write the answer.

- $164 + 47 + 36$ **247**
- $(27 \times 8) \times 25$ **5400**
- 6×45 **270**

Write the number in Roman numerals.

- 95 **XCV**
- 874 **DCCCLXXIV**
- 1561 **MDLXI**

Solve.

- The children in the Bovari family are to share equally 24 brownies and 39 chocolate chip cookies. How many Bovari children are there? **3**
How many brownies and cookies does each child get? **8 brownies, 13 cookies**

UNIT 14

Fractions

Theme: Summer Activities

Lesson	Objective		Pages
Preview		Review equivalent fractions.	313
1	A59	Add fractions with like denominators.	314–315
2	A60	Subtract fractions with like denominators.	316–317
3	N23	Write a fraction as a mixed numeral and vice versa.	318–319
4	A61	Add mixed numerals with like denominators.	320–321
5	A62	Subtract fractions from whole numbers.	322–323
6	A63	Subtract mixed numerals with like denominators.	324–325
7	A64	Understand the meaning of probability; find probabilities.	326–327
8	PS14	Solve problems involving fractions and decimals.	328–329
Test		Fractions	330
Review		Number theory	331

About This Unit


Unit 14 extends the fraction concepts developed in Unit 7. Earlier, students learned about fractional parts of a whole object and of a set of objects. They also recognized and determined equivalent fractions. In this unit, students learn how to add and subtract fractions and mixed numerals with like denominators. The previously learned skills from Unit 7 are essential for the successful completion of this unit.

As before, a strong emphasis is placed on the use of concrete materials to model the various fraction computation situations.

a. Adding fractional parts of a whole

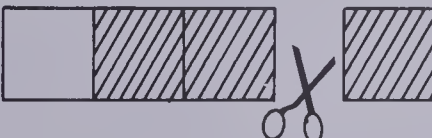
$$\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$


b. Adding fractional parts of a set

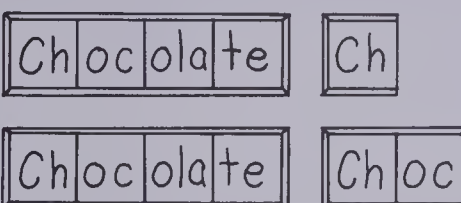


$$\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$$

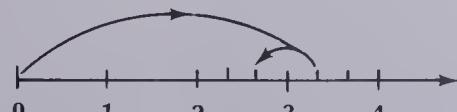
c. Subtracting fractional parts of a whole

$$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$$


d. Adding mixed numerals

$$1\frac{1}{4} + 1\frac{2}{4} = 2\frac{3}{4}$$


e. Subtracting mixed numerals



$$3\frac{1}{3} - \frac{2}{3} = 2\frac{2}{3}$$

The regrouping skills used in the addition and subtraction of whole numbers are also extended in this unit as the students add and subtract fractions.

$$\begin{array}{r} 3\frac{4}{5} \\ + 2\frac{3}{5} \\ \hline 5\frac{7}{5} = \boxed{5 + \frac{5}{5} + \frac{2}{5}} = 6\frac{2}{5} \end{array}$$

$$\begin{array}{r} 8\frac{5}{4} \\ \cancel{8}^1\frac{1}{4} \\ - 7\frac{3}{4} \\ \hline 1\frac{2}{4} \end{array}$$

Although the students have determined equivalent fractions in Unit 7 by dividing the numerator and the denominator by the same number, they are not expected to simplify their computations to lowest terms in this unit.

Lesson 7 introduces probability. Several activities are suggested in the lesson to help the students understand the meaning and usefulness of this concept. Students need to be able to recognize equivalent fractions for this lesson. Flip a coin. Compare the predicted outcome to the actual outcome.

Probability a tail is flipped:

$$\frac{1}{2}$$

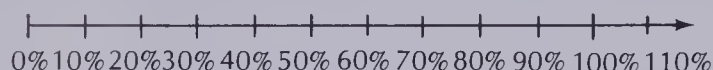
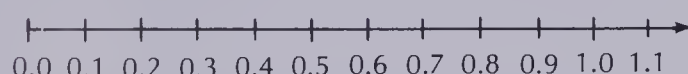
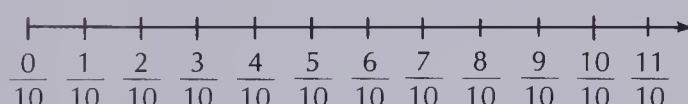
Actual number of times a tail is flipped:

$$\frac{25}{50}$$

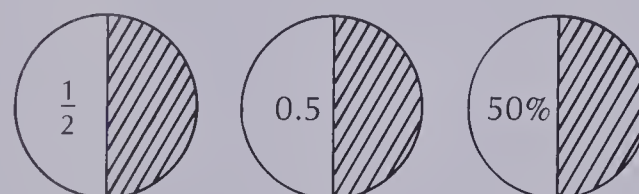
Ideas

The fraction concepts of this end-of-the-year unit can be allied with previously learned decimal and percent concepts.

a.



b.

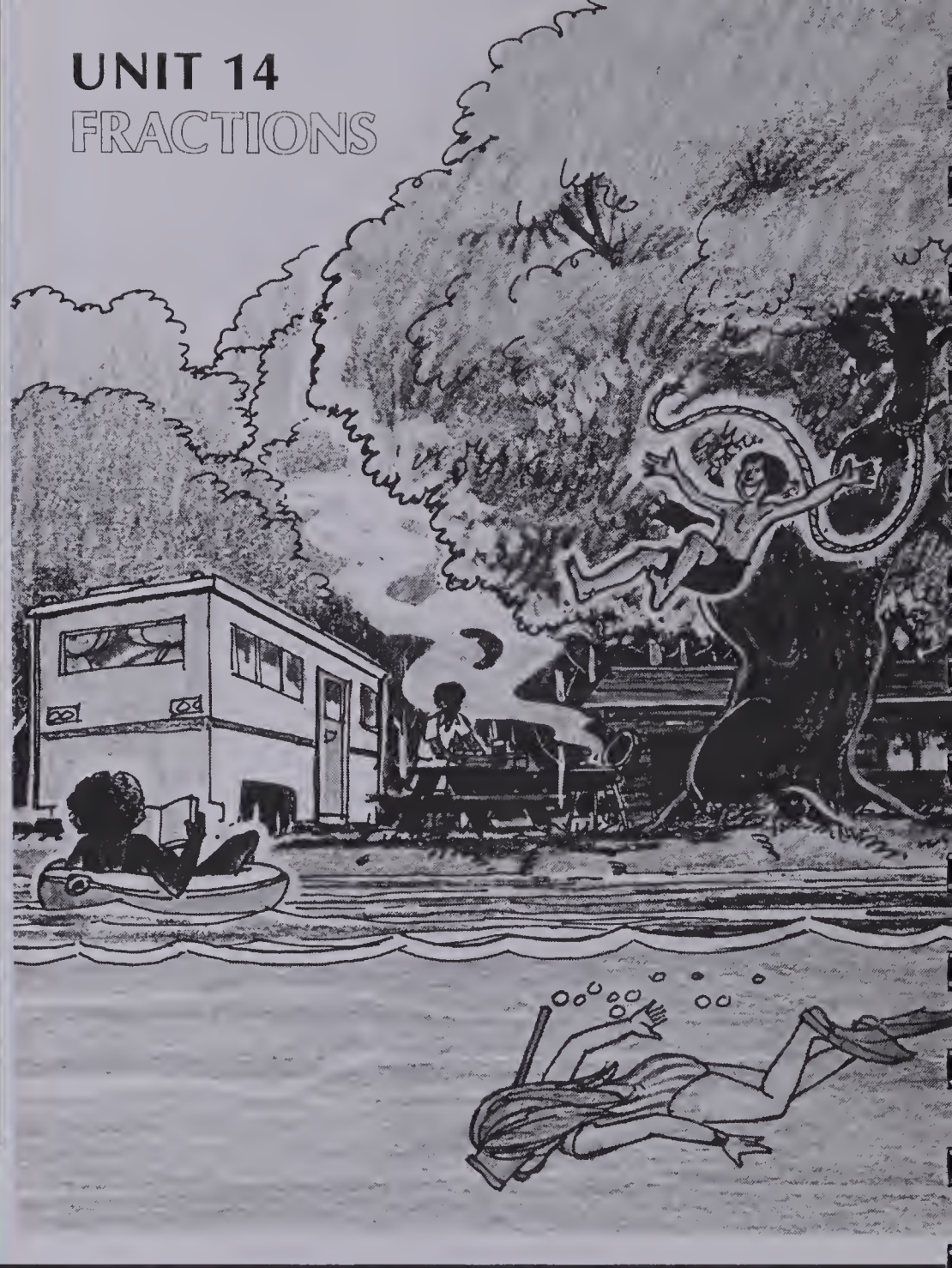


c.

$$\begin{array}{r} 2\frac{17}{10} \\ \cancel{2}^1\frac{7}{10} \\ - 1\frac{9}{10} \\ \hline 1\frac{8}{10} \end{array} \qquad \begin{array}{r} 2\frac{17}{10} \\ \cancel{2}^1\frac{7}{10} \\ - 1.9 \\ \hline 1.8 \end{array}$$

UNIT 14

FRACTIONS



Unit 14 Objective	Test Questions	Pages
A59	1-5	314-315
A60	6-10	316-317
N23	11-20	318-319
A61	21-25	320-321
A62	26-30	322-323
A63	31-35	324-325
A64	36, 37	326-327

Pretest

Unit 14

Add or subtract.

$$\begin{array}{r} 1. \quad \frac{3}{8} \\ + \frac{2}{8} \\ \hline \frac{5}{8} \end{array}$$

$$\begin{array}{r} 2. \quad \frac{1}{11} \\ + \frac{7}{11} \\ \hline \frac{8}{11} \end{array}$$

$$\begin{array}{r} 3. \quad \frac{4}{25} \\ + \frac{12}{25} \\ \hline \frac{16}{25} \end{array}$$

$$\begin{array}{r} 4. \quad \frac{1}{3} \\ + \frac{2}{3} \\ \hline \frac{3}{3} \end{array}$$

$$\begin{array}{r} 5. \quad \frac{5}{7} \\ + \frac{1}{7} \\ \hline \frac{6}{7} \end{array}$$

$$\begin{array}{r} 6. \quad \frac{5}{6} \\ - \frac{4}{6} \\ \hline \frac{1}{6} \end{array}$$

$$\begin{array}{r} 7. \quad \frac{14}{15} \\ - \frac{7}{15} \\ \hline \frac{7}{15} \end{array}$$

$$\begin{array}{r} 8. \quad \frac{17}{20} \\ - \frac{4}{20} \\ \hline \frac{13}{20} \end{array}$$

$$\begin{array}{r} 9. \quad \frac{32}{100} \\ - \frac{17}{100} \\ \hline \frac{15}{100} \end{array}$$

$$\begin{array}{r} 10. \quad \frac{3}{4} \\ - \frac{3}{4} \\ \hline 0 \end{array}$$

Write the mixed numeral.

$$11. \quad \frac{3}{2} = 1\frac{1}{2}$$

$$12. \quad \frac{8}{3} = 2\frac{2}{3}$$

$$13. \quad \frac{10}{4} = 2\frac{2}{4}$$

$$14. \quad \frac{15}{7} = 2\frac{1}{7}$$

$$15. \quad \frac{18}{5} = 3\frac{3}{5}$$

Write the fraction.

$$16. \quad 1\frac{1}{4} = \frac{5}{4}$$

$$17. \quad 2\frac{1}{3} = \frac{7}{3}$$

$$18. \quad 1\frac{5}{8} = \frac{13}{8}$$

$$19. \quad 2\frac{5}{6} = \frac{17}{6}$$

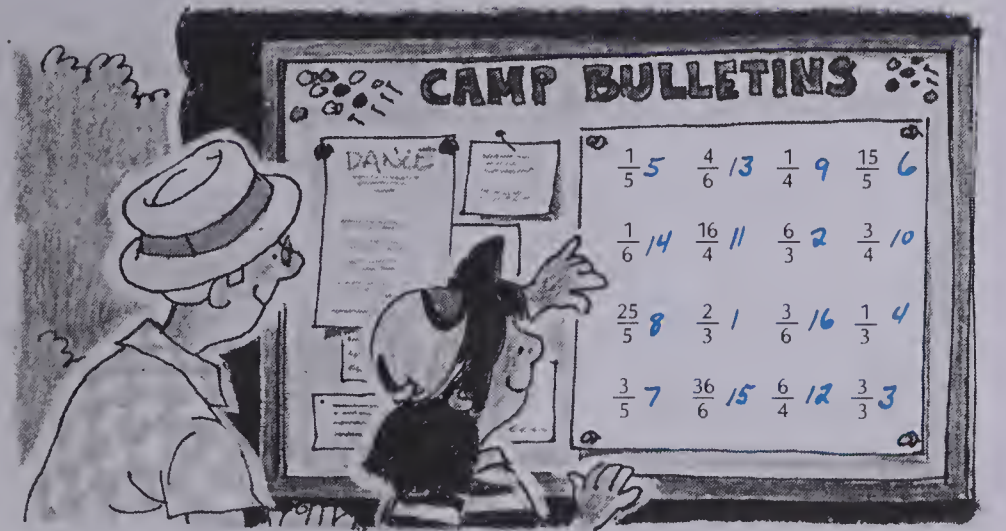
$$20. \quad 3\frac{7}{8} = \frac{31}{8}$$

Fraction Hunt

For each fraction in the chart, find an equivalent fraction in the illustration.

How are the answers in each row alike? *All have the same denominator.*

1. $\frac{6}{9}$	2. $\frac{2}{1}$	3. $\frac{1}{1}$	4. $\frac{2}{6}$
5. $\frac{2}{10}$	6. $\frac{3}{1}$	7. $\frac{6}{10}$	8. $\frac{5}{1}$
9. $\frac{2}{8}$	10. $\frac{9}{12}$	11. $\frac{4}{1}$	12. $\frac{3}{2}$
13. $\frac{2}{3}$	14. $\frac{2}{12}$	15. $\frac{6}{1}$	16. $\frac{1}{2}$



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Add.

$$\begin{array}{r} 21. \quad 4\frac{1}{4} \\ + 3\frac{3}{4} \\ \hline 7\frac{4}{4} = 8 \end{array} \quad \begin{array}{r} 22. \quad 6\frac{5}{9} \\ + 2\frac{3}{9} \\ \hline 8\frac{8}{9} \end{array} \quad \begin{array}{r} 23. \quad 8\frac{7}{8} \\ + 2\frac{3}{8} \\ \hline 10\frac{10}{8} = 11\frac{2}{8} \end{array} \quad \begin{array}{r} 24. \quad 7\frac{2}{3} \\ + 5\frac{2}{3} \\ \hline 12\frac{4}{3} = 13\frac{1}{3} \end{array} \quad \begin{array}{r} 25. \quad 5\frac{9}{10} \\ + 6\frac{7}{10} \\ \hline 11\frac{16}{10} = 12\frac{6}{10} \end{array}$$

Subtract.

$$\begin{array}{r} 26. \quad 8 \\ - 3\frac{7}{9} \\ \hline 4\frac{2}{9} \end{array} \quad \begin{array}{r} 27. \quad 2 \\ - \frac{1}{3} \\ \hline 1\frac{2}{3} \end{array} \quad \begin{array}{r} 28. \quad 5 \\ - \frac{4}{5} \\ \hline 4\frac{1}{5} \end{array} \quad \begin{array}{r} 29. \quad 12 \\ - \frac{3}{4} \\ \hline 11\frac{1}{4} \end{array} \quad \begin{array}{r} 30. \quad 1 \\ - \frac{5}{7} \\ \hline \frac{2}{7} \end{array}$$

$$\begin{array}{r} 31. \quad 5 \\ - 1\frac{3}{4} \\ \hline 3\frac{1}{4} \end{array} \quad \begin{array}{r} 32. \quad 8\frac{2}{10} \\ - \frac{7}{10} \\ \hline 7\frac{5}{10} \end{array} \quad \begin{array}{r} 33. \quad 11\frac{5}{9} \\ - 6\frac{8}{9} \\ \hline 4\frac{6}{9} \end{array} \quad \begin{array}{r} 34. \quad 15\frac{2}{3} \\ - 3\frac{1}{3} \\ \hline 12\frac{1}{3} \end{array} \quad \begin{array}{r} 35. \quad 2\frac{1}{11} \\ - 1\frac{10}{11} \\ \hline \frac{2}{11} \end{array}$$

Solve.

You roll a regular die. What is the probability you will roll:

36. a 3? $\frac{1}{6}$ 37. a number less than 5? $\frac{4}{6}$

UNIT 14

PREVIEW

Suggestions

Use the illustrations on pages 312 and 313 to begin a discussion about the activities the students plan to do this summer. Ask, "Who is planning to go to camp? Which water activities do you like? Where is your family going to spend the summer holidays?"

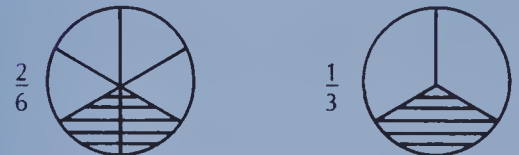
About the Page

Page 313 reviews equivalent fractions that were presented in Unit 7. (Students worked with equivalent fractions and proportions in Unit 7.)

Show illustrations similar to the following on the chalkboard. Then review the calculations for writing equivalent fractions.



$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$$



$$\frac{2}{6} = \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$$

Point out that when the numerator and denominator of a fraction are multiplied or divided by the same number, an equivalent fraction results.

Also review fraction families, e.g., the thirds.



Point out how whole numbers can have fraction names, e.g., $\frac{3}{3} = 1$, $\frac{6}{3} = 2$, and $\frac{9}{3} = 3$.

Reinforcement

Use the sets of fraction domino cards made in the second Reinforcement activity on page 157. Have the students play the game, as described on page 157, and make equivalent fractions.




UNIT 14 LESSON 1


Objective A59

Add fractions with like denominators.

Introducing the Lesson

Review the meaning of fractions with the following kinds of questions.

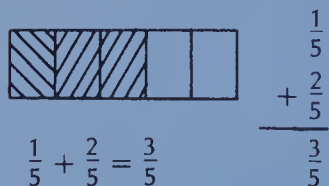
a. What is $\frac{2}{7}$ of this rectangle?  Show it.

b. What is $\frac{3}{4}$ of this set of people? Circle them. 

c. How many hours is $\frac{1}{3}$ of a day?

Teaching the Lesson

Sketch a rectangle on the chalkboard. Ask a student to shade one fifth of it in white chalk. Ask another student to shade two fifths of the same rectangle in red chalk. Record the fractional parts shaded. "How much of the rectangle is shaded in all?" Record the corresponding addition in horizontal and vertical form.



Repeat using other similar examples. Read the top of page 314.

Sketch a set of 24 stars on the chalkboard. Ask a student to circle $\frac{1}{8}$ of them. Have a second student circle $\frac{3}{8}$ of them. Ask "What part of the set of stars is circled?" Record the corresponding addition horizontally and vertically.



After trying other similar examples, have the students shade $\frac{2}{10}$ and then the remaining $\frac{8}{10}$ of a rectangle. Ask "What part of the rectangle is shaded?"



Point out that the whole rectangle is shaded and that $\frac{10}{10} = 1$.

After the students seem comfortable with the process of adding fractions with like denominators, have someone make a rule about it. *Add the numerators. The denominators stay the same.*

Adding Fractions

Alice watered $\frac{1}{4}$ of the lawn in the

morning and $\frac{2}{4}$ in the afternoon.

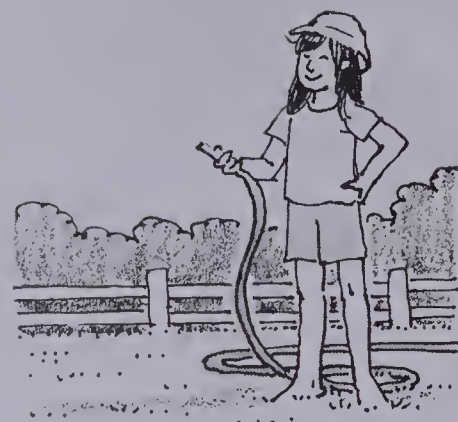
How much of the lawn did she water?

1 fourth + 2 fourths = 3 fourths

$$\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$$

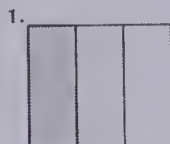
$$\begin{array}{r} \frac{1}{4} \\ + \frac{2}{4} \\ \hline \frac{3}{4} \end{array}$$

Alice watered $\frac{3}{4}$ of the lawn.

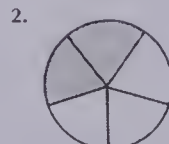


EXERCISES

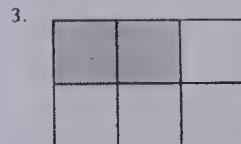
Add.



$$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$$



$$\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$$



$$\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$$

4. 1 fifth + 3 fifths = 4 fifths

5. 2 sevenths + 3 sevenths = 5 sevenths

6. 3 tenths + 4 tenths = 7 tenths

7. 4 eighths + 3 eighths = 7 eighths

Copy and complete

8. $\frac{1}{8} + \frac{2}{8} = \frac{\blacksquare}{8}$ 3

9. $\frac{1}{4} + \frac{1}{4} = \frac{\blacksquare}{4}$ 2

10. $\frac{2}{3} + \frac{1}{3} = \frac{\blacksquare}{3}$ 3

11. $\frac{1}{6} + \frac{4}{6} = \frac{\blacksquare}{6}$ 5

12. $\frac{3}{5} + \frac{1}{5} = \frac{\blacksquare}{5}$ 4

13. $\frac{2}{9} + \frac{3}{9} = \frac{\blacksquare}{9}$ 5

Add.

14. $\frac{4}{8} + \frac{1}{8} = \frac{\blacksquare}{8}$ 5

15. $\frac{1}{10} + \frac{4}{10} = \frac{\blacksquare}{10}$ 5

16. $\frac{1}{7} + \frac{4}{7} = \frac{\blacksquare}{7}$ 5

17. $\frac{1}{4} + \frac{1}{4} = \frac{\blacksquare}{4}$ 2

18. $\frac{2}{5} + \frac{2}{5} = \frac{\blacksquare}{5}$ 4

314

Using the Exercises

- Questions 1 to 18 developmentally aid the students with the addition of fractions. The first three questions are illustrated so that the students can picture the situation. Questions 4 to 7 are in words, so the students can more clearly understand that only numerators are added. Questions 8 to 13 are written horizontally, while questions 14 to 18 are in the standard format.
- Ask, "What is another name for $\frac{3}{3}$?" after the students complete question 10.
- Note that students are not required to simplify answers at this time.

PRACTICE

Add.

1. $\frac{2}{6} + \frac{3}{6} = \frac{5}{6}$
2. $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$
3. $\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$
4. $\frac{2}{8} + \frac{2}{8} = \frac{4}{8}$
5. $\frac{2}{3} + \frac{1}{3} = \frac{3}{3}$
6. $\frac{1}{6} + \frac{3}{6} = \frac{4}{6}$
7. $\frac{2}{10} + \frac{7}{10} = \frac{9}{10}$
8. $\frac{3}{9} + \frac{4}{9} = \frac{7}{9}$
9. $\frac{2}{7} + \frac{4}{7} = \frac{6}{7}$
10. $\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$
11. $\frac{1}{10} + \frac{3}{10} = \frac{4}{10}$
12. $\frac{2}{15} + \frac{2}{15} = \frac{4}{15}$
13. $\frac{1}{4} + \frac{3}{4} = \frac{4}{4}$
14. $\frac{3}{12} + \frac{1}{12} = \frac{4}{12}$
15. $\frac{1}{100} + \frac{2}{100} = \frac{3}{100}$
16. $\frac{1}{7} + \frac{3}{7} = \frac{4}{7}$
17. $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$
18. $\frac{3}{16} + \frac{4}{16} = \frac{7}{16}$
19. $\frac{5}{8} + \frac{2}{8} = \frac{7}{8}$
20. $\frac{8}{25} + \frac{7}{25} = \frac{15}{25}$

Solve.

21. Bill read $\frac{1}{6}$ of his book one day and $\frac{3}{6}$ the next day.
How much of his book did he read? $\frac{4}{6}$
22. Fran and Martina went on a hike. They hiked $\frac{2}{10}$ of the distance the first hour and $\frac{1}{10}$ the second hour. How much of the distance had they hiked? $\frac{3}{10}$

Simplifying Fractions

You can simplify a fraction such as $\frac{10}{20}$ by dividing both its numerator and denominator by the same number.

$$\frac{10}{20} = \frac{10 \div 2}{20 \div 2} = \frac{5}{10} \quad \text{or} \quad \frac{10}{20} = \frac{10 \div 5}{20 \div 5} = \frac{2}{4} \quad \text{or} \quad \frac{10}{20} = \frac{10 \div 10}{20 \div 10} = \frac{1}{2}$$

Which of the answers is the **simplest**? Why?

Write each fraction in simplest form.

- a. $\frac{6}{12} = \frac{1}{2}$
- b. $\frac{6}{8} = \frac{3}{4}$
- c. $\frac{12}{18} = \frac{2}{3}$
- d. $\frac{30}{50} = \frac{3}{5}$
- e. $\frac{9}{15} = \frac{3}{5}$

315

Extra Practice

Worksheet A59

Pages 314-315

Add.

1. $\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$
2. $\frac{3}{8} + \frac{4}{8} = \frac{7}{8}$
3. $\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$
4. $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$
5. $\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$
6. $\frac{1}{9} + \frac{4}{9} = \frac{5}{9}$
7. $\frac{5}{8} + \frac{1}{8} = \frac{6}{8}$
8. $\frac{5}{10} + \frac{4}{10} = \frac{9}{10}$
9. $\frac{3}{9} + \frac{4}{9} = \frac{7}{9}$
10. $\frac{1}{10} + \frac{3}{10} = \frac{4}{10}$
11. $\frac{6}{10} + \frac{3}{10} = \frac{9}{10}$
12. $\frac{2}{10} + \frac{7}{10} = \frac{9}{10}$
13. $\frac{5}{10} + \frac{3}{10} = \frac{8}{10}$
14. $\frac{8}{10} + \frac{1}{10} = \frac{9}{10}$
15. $\frac{2}{10} + \frac{3}{10} = \frac{5}{10}$

Assigning the Practice

Minimum: 1-16

Average: 5-22

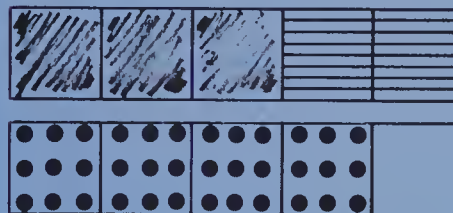
Enriched: 5-22

Reinforcement

1. Have the students complete the following addition table.

+	$\frac{2}{9}$	$\frac{5}{9}$	$\frac{3}{9}$	$\frac{1}{9}$	$\frac{4}{9}$
$\frac{1}{9}$					
$\frac{3}{9}$					
$\frac{5}{9}$					
$\frac{4}{9}$					
$\frac{2}{9}$					

2. Ask the students to study the following illustration and then answer the questions.



Write the fraction for:

- a. the striped part,
- b. the spotted part,
- c. the shaded part,
- d. the white part.

Write the sum for:

- e. the striped and shaded parts,
- f. the striped and spotted parts,
- g. the white and shaded parts,
- h. the spotted and white parts,
- i. the shaded and spotted parts,
- j. the striped and white parts.

Enrichment

1. Assign *Simplifying Fractions* at the bottom of page 315.

2. Have the students calculate these sums.

- a. $\frac{1}{6} + \frac{2}{6} + \frac{3}{6}$
- b. $\frac{5}{12} + \frac{2}{12} + \frac{4}{12}$
- c. $\frac{3}{15} + \frac{7}{15} + \frac{1}{15} + \frac{2}{15}$
- d. $\frac{6}{30} + \frac{11}{30} + \frac{4}{30} + \frac{7}{30} + \frac{1}{30}$

UNIT 14 LESSON 2

Objective A60

Subtract fractions with like denominators.

Introducing the Lesson

Ask 10 students to stand at the front of the room. Tell the boys to stand to the left and the girls to the right. Ask, "What fractional part of the standing students are girls? What part are boys?" Ask a student to record an addition sentence about the standing students using fractions.

$$\frac{4}{10} + \frac{6}{10} = \frac{10}{10}$$

Now ask the boys to sit down. Ask "What fractional part of the standing students are girls?" Record the corresponding subtraction sentence.

$$\frac{10}{10} - \frac{6}{10} = \frac{4}{10}$$

Teaching the Lesson

Give each student several strips of paper, crayons, and a pair of scissors. Have them fold the strips into equal sections, colour fractional parts of them, and then cut off a part to model the following subtractions.

$$\frac{6}{7} - \frac{4}{7} \quad \frac{5}{5} - \frac{1}{5} \quad \frac{7}{8} - \frac{2}{8}$$

$$\frac{12}{15} - \frac{11}{15} \quad \frac{9}{20} - \frac{3}{20} \quad \frac{11}{25} - \frac{4}{25}$$

For each example, have the students record the subtraction equation horizontally and vertically.



$$\begin{array}{r} \frac{6}{7} \\ - \frac{4}{7} \\ \hline \frac{2}{7} \end{array}$$



$$\frac{6}{7} - \frac{4}{7} = \frac{2}{7}$$

Have the students model 9 tenths minus 4 tenths with their paper strips. Ask them to record the fraction first in decimals and then in fractions.

Read and discuss the problem at the top of page 316. Have the students make up a rule about subtracting fractions with like denominators. *Subtract the numerators. The denominators stay the same.*

Subtracting Fractions

When Greg opened his lemonade stand at 14:00, the jug of lemonade was $\frac{4}{5}$ full. By 15:00, he had sold $\frac{3}{5}$ of the jug. How full was the jug then?

$$\begin{array}{r} 4 \text{ fifths} - 3 \text{ fifths} = 1 \text{ fifth} \\ \frac{4}{5} - \frac{3}{5} = \frac{1}{5} \\ \text{The jug was } \frac{1}{5} \text{ full.} \end{array}$$



EXERCISES

Subtract.

1. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$

2. $\frac{5}{6} - \frac{1}{6} = \frac{4}{6}$

3. $\frac{3}{5} - \frac{2}{5} = \frac{1}{5}$

Copy and complete.

4. $\frac{5}{7} - \frac{3}{7} = \frac{\blacksquare}{7}$ $\frac{2}{7}$

5. $\frac{5}{8} - \frac{2}{8} = \frac{\blacksquare}{8}$ $\frac{3}{8}$

6. $\frac{10}{10} - \frac{1}{10} = \frac{\blacksquare}{10}$ $\frac{9}{10}$

7. $\frac{4}{6} - \frac{1}{6} = \frac{\blacksquare}{6}$ $\frac{3}{6}$

8. $\frac{5}{5} - \frac{2}{5} = \frac{\blacksquare}{5}$ $\frac{3}{5}$

9. $\frac{2}{9} - \frac{1}{9} = \frac{\blacksquare}{9}$ $\frac{1}{9}$

Subtract.

10. $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$

11. $\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$

12. $\frac{5}{6} - \frac{4}{6} = \frac{1}{6}$

13. $\frac{9}{10} - \frac{6}{10} = \frac{3}{10}$

14. $\frac{7}{8} - \frac{5}{8} = \frac{2}{8}$

15. $\frac{6}{7} - \frac{2}{7} = \frac{4}{7}$

16. $\frac{11}{12} - \frac{5}{12} = \frac{6}{12}$

17. $\frac{7}{9} - \frac{4}{9} = \frac{3}{9}$

18. $\frac{11}{15} - \frac{6}{15} = \frac{5}{15}$

19. $\frac{8}{14} - \frac{6}{14} = \frac{2}{14}$

316 $\frac{4}{7}$ $\frac{6}{12}$ $\frac{3}{9}$ $\frac{5}{15}$ $\frac{2}{14}$

Using the Exercises

- Questions 1 to 3 are a continuation of the lesson's activities.
- Questions 4 to 9 include horizontal subtraction examples.
- Questions 10 to 19 include vertical subtraction examples.

Note: the students are not required to simplify fractions at this time.

PRACTICE

Subtract.

1. $\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$
2. $\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$
3. $\frac{7}{8} - \frac{2}{8} = \frac{5}{8}$
4. $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$
5. $\frac{3}{7} - \frac{1}{7} = \frac{2}{7}$
6. $\frac{7}{10} - \frac{3}{10} = \frac{4}{10}$
7. $\frac{5}{8} - \frac{3}{8} = \frac{2}{8}$
8. $\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$
9. $\frac{6}{7} - \frac{5}{7} = \frac{1}{7}$
10. $\frac{5}{10} - \frac{4}{10} = \frac{1}{10}$
11. $\frac{4}{4} - \frac{3}{4} = \frac{1}{4}$
12. $\frac{8}{9} - \frac{1}{9} = \frac{7}{9}$
13. $\frac{11}{12} - \frac{8}{12} = \frac{3}{12}$
14. $\frac{15}{100} - \frac{2}{100} = \frac{13}{100}$
15. $\frac{6}{50} - \frac{5}{50} = \frac{1}{50}$
16. $\frac{12}{15} - \frac{5}{15} = \frac{7}{15}$
17. $\frac{7}{12} - \frac{5}{12} = \frac{2}{12}$
18. $\frac{11}{20} - \frac{7}{20} = \frac{4}{20}$
19. $\frac{24}{30} - \frac{14}{30} = \frac{10}{30}$
20. $\frac{6}{8} - \frac{3}{8} = \frac{3}{8}$

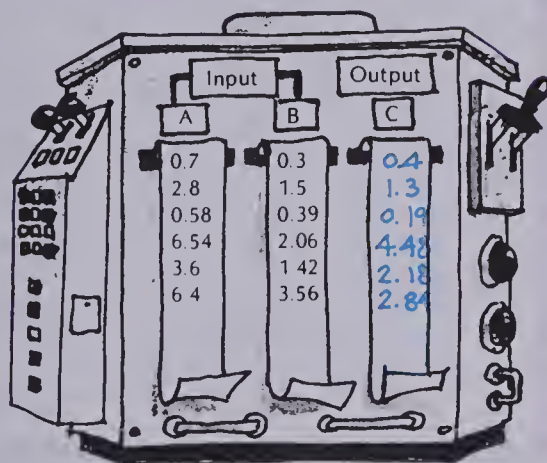
Solve.

21. Nicole had three quarters of a dollar. She spent one quarter. What fraction of a dollar did she have left? $\frac{2}{4}$
22. Frank had to paint $\frac{5}{6}$ of the garage white. By the end of the morning he had painted $\frac{4}{6}$. How much remained to be painted? $\frac{1}{6}$

Computer Program

Copy and complete the chart.

- 1 READ A AND B
- 2 $C = A - B$
- 3 PRINT C
- 4 END



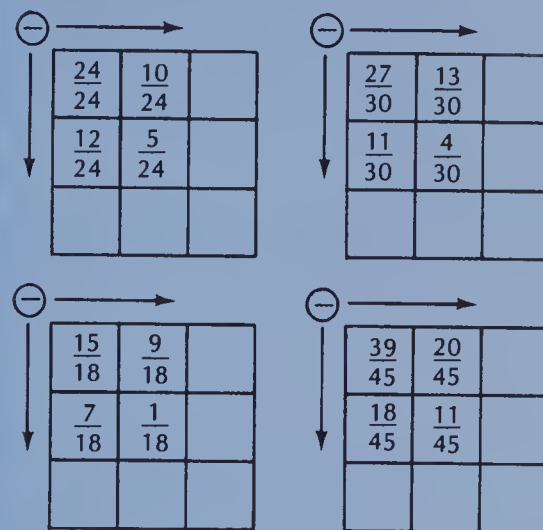
317

Assigning the Practice

Minimum: 1-16
Average: 5-22
Enriched: 5-22

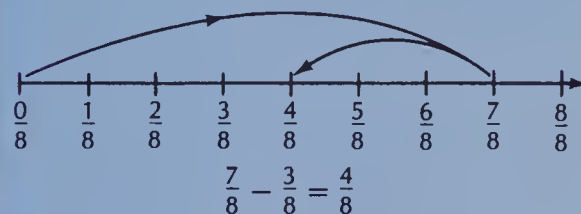
Reinforcement

1. Have the students complete the following cross-number puzzles.



2. Ask the students to make number-line diagrams, like the one below, to show these subtractions.

- a. $\frac{6}{8} - \frac{4}{8}$ b. $\frac{7}{10} - \frac{3}{10}$ c. $\frac{5}{6} - \frac{2}{6}$



Enrichment

1. Assign *Computer Program* at the bottom of page 317.
2. Ask the students to use order of operations rules to complete the following.

- a. $\frac{4}{8} + \left(\frac{7}{8} - \frac{2}{8}\right)$
- b. $\left(\frac{11}{12} - \frac{3}{12}\right) - \frac{8}{12}$
- c. $\left(\frac{5}{9} + \frac{1}{9}\right) - \frac{4}{9}$
- d. $\frac{3}{15} + \left(\frac{14}{15} - \frac{2}{15}\right)$

Extra Practice

Worksheet A60

Pages 316-317

Subtract.

1. $\frac{5}{6} - \frac{2}{6} = \frac{3}{6}$
2. $\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$
3. $\frac{4}{7} - \frac{1}{7} = \frac{3}{7}$
4. $\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$
5. $\frac{6}{8} - \frac{3}{8} = \frac{3}{8}$
6. $\frac{7}{10} - \frac{2}{10} = \frac{5}{10}$
7. $\frac{4}{7} - \frac{1}{7} = \frac{3}{7}$
8. $\frac{8}{9} - \frac{5}{9} = \frac{3}{9}$
9. $\frac{6}{8} - \frac{2}{8} = \frac{4}{8}$
10. $\frac{9}{10} - \frac{4}{10} = \frac{5}{10}$
11. $\frac{8}{10} - \frac{6}{10} = \frac{2}{10}$
12. $\frac{6}{10} - \frac{5}{10} = \frac{1}{10}$
13. $\frac{7}{10} - \frac{4}{10} = \frac{3}{10}$
14. $\frac{5}{10} - \frac{2}{10} = \frac{3}{10}$
15. $\frac{9}{10} - \frac{7}{10} = \frac{2}{10}$

UNIT 14 LESSON 3

Objective N23

Write a fraction as a mixed numeral and vice versa.

Introducing the Lesson

Show drawings similar to the following. Ask the students "How many fourths equal one whole?" The students then shade the fraction.



"How many ninths equal one whole?"



Teaching the Lesson

Illustrate additions, similar to the following, with chalkboard drawings. Ask the students to find the sum. Point out that one (or more) of the addends is a name for one whole; thus, the sum is greater than one whole. Explain how the sum can be written two ways; as a **fraction** or as a **mixed numeral**.



$$\frac{7}{7} + \frac{3}{7} = \boxed{\frac{10}{7}} \text{ or } 1 + \frac{3}{7} = \boxed{1\frac{3}{7}}$$



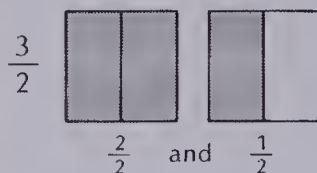
$$\frac{4}{4} + \frac{4}{4} + \frac{1}{4} = \boxed{\frac{9}{4}} \text{ or } 1 + 1 + \frac{1}{4} = \boxed{2\frac{1}{4}}$$

Write mixed numerals, like the following, on the chalkboard. Ask the students to illustrate them. Show the students how to rewrite the mixed numeral as a fraction by writing an addition expression. The first addends mentioned in the addition are fractions representing one whole.

$$1\frac{1}{3} \rightarrow \text{[shaded rectangles]} \rightarrow \frac{3}{3} + \frac{1}{3} = \boxed{\frac{4}{3}}$$

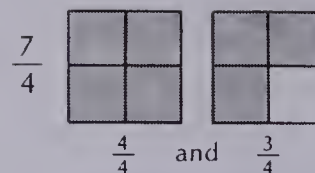
$$2\frac{1}{5} \rightarrow \text{[shaded rectangles]} \rightarrow \frac{5}{5} + \frac{5}{5} + \frac{1}{5} = \boxed{\frac{11}{5}}$$

Mixed Numerals



$$1 \text{ and } \frac{1}{2}$$

$$1\frac{1}{2}$$



$$1 \text{ and } \frac{3}{4}$$

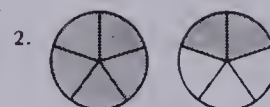
$$1\frac{3}{4}$$

EXERCISES

Find the mixed numeral.



$$\frac{5}{4} = 1\frac{1}{4}$$



$$\frac{7}{5} = 1\frac{2}{5}$$



$$\frac{4}{3} = 1\frac{1}{3}$$



$$\frac{11}{6} = \frac{6}{6} + \frac{5}{6} = 1\frac{5}{6}$$



$$\frac{12}{8} = \frac{8}{8} + \frac{4}{8} = 1\frac{4}{8}$$



$$\frac{14}{10} = \frac{10}{10} + \frac{4}{10} = 1\frac{4}{10}$$

7. $\frac{8}{5} = \frac{5}{5} + \frac{3}{5} = 1\frac{3}{5}$

8. $\frac{6}{4} = \frac{4}{4} + \frac{2}{4} = 1\frac{2}{4}$

9. $\frac{5}{2} = \frac{2}{2} + \frac{2}{2} + \frac{1}{2} = 2\frac{1}{2}$

10. $\frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = 2\frac{1}{3}$

11. $\frac{5}{3} = 1\frac{2}{3}$

12. $\frac{9}{6} = 1\frac{3}{6}$

13. $\frac{10}{3} = 3\frac{1}{3}$

14. $\frac{13}{4} = 3\frac{1}{4}$

Find the fraction.

15. $1\frac{1}{2} = \frac{2}{2} + \frac{1}{2} = \frac{3}{2}$

16. $2\frac{2}{8} = \frac{8}{8} + \frac{8}{8} + \frac{2}{8} = \frac{18}{8}$

17. $1\frac{1}{4} = \frac{4}{4} + \frac{1}{4} = \frac{5}{4}$

18. $1\frac{4}{5} = \frac{5}{5} + \frac{4}{5} = \frac{9}{5}$

19. $3\frac{3}{10} = \frac{30}{10} + \frac{3}{10} = \frac{33}{10}$

20. $2\frac{1}{9} = \frac{18}{9} + \frac{1}{9} = \frac{19}{9}$

Using the Exercises

- Questions 1 to 6 aid the students in changing a fraction to a mixed numeral with an illustration.
 - For questions 7 to 14, students must write a mixed numeral equal to a fraction without the aid of an illustration. Some of these questions should be done orally to ensure that the students can visualize the situation.
-
- $$\frac{10}{3} = \frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$$
- $$\text{or } \frac{10}{3} = 1 + 1 + 1 + \frac{1}{3} = 3\frac{1}{3}$$
- Questions 15 to 20 involve changing a mixed numeral to a fraction. Provide illustrations where necessary.

PRACTICE

Rewrite the fraction as a mixed numeral.

1. $\frac{6}{4} = 1\frac{2}{4}$
2. $\frac{7}{6} = 1\frac{1}{6}$
3. $\frac{9}{5} = 1\frac{4}{5}$
4. $\frac{4}{3} = 1\frac{1}{3}$
5. $\frac{6}{5} = 1\frac{1}{5}$
6. $\frac{11}{8} = 1\frac{3}{8}$
7. $\frac{10}{4} = 2\frac{2}{4}$
8. $\frac{19}{10} = 1\frac{9}{10}$
9. $\frac{7}{2} = 3\frac{1}{2}$
10. $\frac{17}{4} = 4\frac{1}{4}$

Rewrite the mixed numeral as a fraction.

11. $1\frac{1}{3} = \frac{4}{3}$
12. $2\frac{3}{4} = \frac{11}{4}$
13. $1\frac{3}{9} = \frac{12}{9}$
14. $1\frac{5}{6} = \frac{11}{6}$
15. $3\frac{2}{3} = \frac{11}{3}$
16. $1\frac{2}{7} = \frac{9}{7}$
17. $1\frac{5}{10} = \frac{15}{10}$
18. $2\frac{5}{10} = \frac{25}{10}$
19. $1\frac{7}{8} = \frac{15}{8}$
20. $4\frac{2}{5} = \frac{22}{5}$

Solve.

21. Mrs. Jensen bought 2 cakes and cut each one into 10 pieces. All of one cake and 6 pieces of the other cake were eaten. How much cake was eaten? $1\frac{6}{10}$
22. Twenty-four campers were divided into 2 sections of 12 each. At the first rest stop, 2 campers from one section were still on the trail. What part of the whole group was present? $\frac{22}{24}$

Another Way

Here is another way to change a fraction to a mixed numeral.

Divide the numerator by the denominator.

Write the remainder as a fraction.

$$\frac{29}{7} \quad \begin{array}{r} 4 \\ 7 \overline{) 29} \\ \underline{-28} \\ 1 \end{array} \quad \frac{29}{7} = 4\frac{1}{7}$$

Use division to find the mixed numeral.

- a. $\frac{33}{6} = 5\frac{3}{6}$
- b. $\frac{52}{3} = 17\frac{1}{3}$
- c. $\frac{188}{5} = 37\frac{3}{5}$
- d. $\frac{2048}{25} = 81\frac{23}{25}$
- e. $\frac{495}{50} = 9\frac{45}{50}$

319

Assigning the Practice

Minimum: 1-21

Average: 1-22

Enriched: 1-22

Reinforcement

1. Ask the students to illustrate these additions and then write the sum in two ways: as a fraction and as a mixed numeral.

$$\frac{6}{6} + \frac{6}{6} + \frac{5}{6} = \frac{17}{6} \text{ or } 2\frac{5}{6}$$

a. $\frac{10}{10} + \frac{3}{10}$

b. $\frac{9}{9} + \frac{9}{9} + \frac{4}{9}$

c. $\frac{7}{7} + \frac{5}{7}$

d. $\frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{1}{2}$

e. $\frac{5}{5} + \frac{5}{5} + \frac{3}{5}$

f. $\frac{6}{6} + \frac{1}{6}$

g. $\frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{4}{4} + \frac{3}{4}$

h. $\frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$

2. Have the students find the total time for each swimmer and then write the sum as a fraction and a mixed numeral.

Swimming Hours

	M	T	W	T	F
Karla	$\frac{1}{2}$	$\frac{1}{2}$		$\frac{1}{2}$	
Chuck	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
Alex	$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$
Agnes		$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

Enrichment

Assign *Another Way* at the bottom of page 319. Point out that fractions indicate division. Ask the students to do the division indicated by these fractions. (The numerator always goes inside the division box.)

1. $\frac{144}{12}$ 2. $\frac{1}{2}$ 3. $\frac{275}{275}$ 4. $\frac{4}{5}$

5. $\frac{16}{1}$ 6. $\frac{375}{25}$ 7. $\frac{3}{4}$ 8. $\frac{45}{15}$

Extra Practice

Worksheet N23

Pages 318-319

Write the mixed numeral.

1. $\frac{7}{3} = 2\frac{1}{3}$
2. $\frac{5}{3} = 1\frac{2}{3}$
3. $\frac{7}{4} = 1\frac{3}{4}$
4. $\frac{9}{4} = 2\frac{1}{4}$
5. $\frac{11}{10} = 1\frac{1}{10}$
6. $\frac{13}{10} = 1\frac{3}{10}$
7. $\frac{15}{10} = 1\frac{5}{10}$
8. $\frac{19}{10} = 1\frac{9}{10}$
9. $\frac{21}{10} = 2\frac{1}{10}$
10. $\frac{35}{10} = 3\frac{5}{10}$
11. $\frac{68}{10} = 6\frac{8}{10}$
12. $\frac{49}{10} = 4\frac{9}{10}$

Write the fraction.

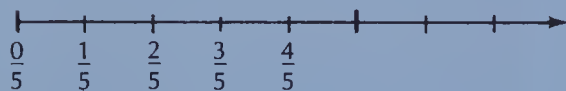
13. $1\frac{1}{4} = \frac{5}{4}$
14. $2\frac{3}{8} = \frac{19}{8}$
15. $2\frac{2}{3} = \frac{8}{3}$
16. $2\frac{5}{6} = \frac{17}{6}$
17. $1\frac{3}{10} = \frac{13}{10}$
18. $2\frac{7}{10} = \frac{27}{10}$
19. $5\frac{4}{10} = \frac{54}{10}$
20. $8\frac{9}{10} = \frac{89}{10}$

Objective A61

Add mixed numerals with like denominators.

Introducing the Lesson

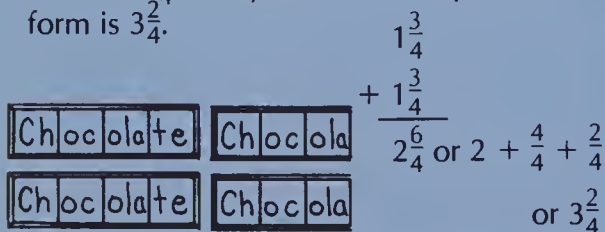
Ask the students to continue the number-line fraction patterns similar to the following.



Have the students name the fractions which are *greater than one*. Ask, "How would you describe a fraction that is greater than one?"

Teaching the Lesson

Show the students $1\frac{3}{4}$ chocolate bars. Then show them another set of $1\frac{3}{4}$ chocolate bars. "How many chocolate bars are there in all?" Explain how one could say that we have $2\frac{6}{4}$ candy bars. Rearrange the sections to show that there are also $3\frac{2}{4}$ candy bars. The simpler form is $3\frac{1}{2}$.



Show two sets of packs of gum. Each set has two whole packs of gum and one pack of gum having only 4 sticks. Ask, "How many packs of gum altogether?"

Rearrange the sticks of gum to show that $4\frac{8}{7} = 5\frac{1}{7}$. The simpler form is $5\frac{1}{7}$.

Repeat with several other examples.

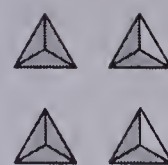
Discuss the addition at the top of page 320. Explain that when mixed numerals are added it is best to record the answer in the simpler form. (Note: "simpler form" here means to have no fractions greater than one in the answer. Students are not required to reduce fractions to lowest terms at this time.)

Adding with Mixed Numerals



$$\begin{array}{r} 1\frac{1}{6} \\ + 2\frac{4}{6} \\ \hline 3\frac{5}{6} \end{array}$$

$$\begin{array}{r} 1\frac{2}{3} \\ + 1\frac{2}{3} \\ \hline 2\frac{4}{3} \end{array}$$



The fraction is greater than one.
 $\frac{4}{3} = 1\frac{1}{3}$

$$2\frac{4}{3} = 2 + 1\frac{1}{3} = 3\frac{1}{3}$$

$3\frac{1}{3}$ is a simpler form of $2\frac{4}{3}$.

EXERCISES

Add.

$$\begin{array}{r} 1. \quad \frac{3}{8} \\ + \frac{2}{8} \\ \hline \frac{5}{8} \end{array}$$

$$\begin{array}{r} 2. \quad 2\frac{3}{8} \\ + 1\frac{2}{8} \\ \hline 3\frac{5}{8} \end{array}$$

$$\begin{array}{r} 3. \quad \frac{2}{7} \\ + \frac{4}{7} \\ \hline \frac{6}{7} \end{array}$$

$$\begin{array}{r} 4. \quad 4\frac{2}{7} \\ + 3\frac{4}{7} \\ \hline 7\frac{6}{7} \end{array}$$

Add. Write the answer as a mixed numeral.

$$\begin{array}{r} 5. \quad \frac{3}{10} \\ + \frac{8}{10} \\ \hline \frac{11}{10} = 1\frac{1}{10} \end{array}$$

$$\begin{array}{r} 6. \quad \frac{3}{4} \\ + \frac{2}{4} \\ \hline \frac{5}{4} = 1\frac{1}{4} \end{array}$$

$$\begin{array}{r} 7. \quad \frac{3}{5} \\ + \frac{4}{5} \\ \hline \frac{7}{5} = 1\frac{2}{5} \end{array}$$

$$\begin{array}{r} 8. \quad \frac{5}{8} \\ + \frac{6}{8} \\ \hline \frac{11}{8} = 1\frac{3}{8} \end{array}$$

Add. Write the answer in simplest form.

$$\begin{array}{r} 9. \quad 4\frac{3}{10} \\ + 1\frac{8}{10} \\ \hline 5\frac{11}{10} = 5 + 1\frac{1}{10} = 6\frac{1}{10} \end{array}$$

$$\begin{array}{r} 10. \quad 2\frac{3}{4} \\ + 7\frac{2}{4} \\ \hline 9\frac{5}{4} = 9 + 1\frac{1}{4} = 10\frac{1}{4} \end{array}$$

$$\begin{array}{r} 11. \quad 1\frac{3}{5} \\ + 3\frac{4}{5} \\ \hline 4\frac{7}{5} = 5\frac{2}{5} \end{array}$$

$$12. \quad 2\frac{4}{9} + 3\frac{5}{9} = 6$$

$$13. \quad 6\frac{5}{8} + 3\frac{5}{8} = 10\frac{2}{8}$$

$$14. \quad 7\frac{6}{10} + 8\frac{7}{10} = 16\frac{3}{10}$$

$$15. \quad 6\frac{6}{7} + 5\frac{4}{7} = 12\frac{3}{7}$$

$$16. \quad 4\frac{13}{15} + 7\frac{5}{15} = 12\frac{3}{15}$$

$$17. \quad 3\frac{5}{12} + 6\frac{7}{12} = 10$$

320

Using the Exercises

- The additions in questions 1 to 4 do not have any fractions greater than one.
- Questions 5 to 11 are paired to aid the students in rewriting fractions greater than one as mixed numerals.
- Questions 12 to 17 require the students to change greater-than-one fractions to mixed numerals. Help the students through each step, if necessary.

$$4\frac{13}{15} + 7\frac{5}{15} = 11\frac{18}{15} = 11 + 1\frac{3}{15} = 12\frac{3}{15}$$

PRACTICE

Add. Write the answer in simplest form.

1. $1\frac{1}{3} + 3\frac{1}{3} = 4\frac{2}{3}$
2. $2\frac{1}{4} + 3\frac{3}{4} = 6$
3. $4\frac{3}{5} + 3\frac{1}{5} = 7\frac{4}{5}$
4. $2\frac{2}{6} + 3\frac{3}{6} = 5\frac{5}{6}$
5. $3\frac{2}{4} + 2\frac{3}{4} = 6\frac{1}{4}$
6. $2\frac{3}{5} + 1\frac{2}{5} = 4$
7. $2\frac{3}{8} + 4\frac{5}{8} = 7$
8. $2\frac{3}{5} + 1\frac{3}{5} = 4\frac{1}{5}$
9. $2\frac{3}{4} + 6\frac{3}{4} = 9\frac{2}{4}$
10. $4\frac{4}{6} + 3\frac{5}{6} = 8\frac{3}{6}$
11. $5\frac{2}{6} + 4\frac{4}{6} = 10$
12. $4\frac{4}{5} + 7\frac{4}{5} = 12\frac{3}{5}$
13. $7\frac{3}{8} + 5\frac{7}{8} = 13\frac{2}{8}$
14. $9\frac{3}{10} + 2\frac{8}{10} = 12\frac{1}{10}$
15. $5\frac{6}{10} + 3\frac{9}{10} = 9\frac{5}{10}$
16. Lee swam for $1\frac{3}{4}$ h on Friday and $2\frac{1}{4}$ h on Saturday. How many hours did he swim on the two days? 4 h

REVIEW

- Add.
- A59 1. $\frac{1}{8} + \frac{4}{8} = \frac{5}{8}$ 2. $\frac{3}{10} + \frac{4}{10} = \frac{7}{10}$ 3. $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$

- Subtract.
- A60 4. $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$ 5. $\frac{9}{10} - \frac{2}{10} = \frac{7}{10}$ 6. $\frac{8}{9} - \frac{3}{9} = \frac{5}{9}$ 7. $\frac{6}{7} - \frac{2}{7} = \frac{4}{7}$

- Write the fraction as a mixed numeral.
- N23 8. $\frac{7}{6} = 1\frac{1}{6}$ 9. $\frac{8}{5} = 1\frac{3}{5}$ 10. $\frac{9}{4} = 2\frac{1}{4}$ 11. $\frac{11}{3} = 3\frac{2}{3}$

- Add. Write the answer in simplest form.
- A61 12. $2\frac{1}{4} + 3\frac{2}{4} = 5\frac{3}{4}$ 13. $6\frac{1}{2} + 1\frac{1}{2} = 8$ 14. $3\frac{4}{5} + 5\frac{3}{5} = 9\frac{2}{5}$

321

Assigning the Practice

Minimum: 1-12
Average: 4-16
Enriched: 4-16

Review Exercises

Questions	Objective	Pages
1-3	A59	314-315
4-7	A60	316-317
8-11	N23	318-319
12-14	A61	320-321

Reinforcement

1. Have the students study the following illustration and then make an illustration to show the sum of each addition listed.



$$2\frac{1}{4} + 1\frac{3}{4} = 4$$

- a. $1\frac{2}{3} + 1\frac{1}{3}$
- b. $2\frac{1}{2} + 1\frac{1}{2}$
- c. $1\frac{2}{4} + 2\frac{3}{4}$
- d. $2\frac{3}{5} + 3\frac{2}{5}$

2. Ask the students to name the next four fractions as mixed numerals.

- a. $\frac{0}{2}, \frac{1}{2}, \frac{2}{2}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$
- b. $\frac{0}{5}, \frac{1}{5}, \frac{2}{5}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$
- c. $\frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$
- d. $\frac{0}{6}, \frac{1}{6}, \frac{2}{6}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$
- e. $\frac{0}{4}, \frac{1}{4}, \frac{2}{4}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$

Enrichment

Have the students add the following.

1. $1\frac{1}{4} + 2\frac{3}{4} + 3\frac{2}{4}$
2. $3\frac{7}{9} + 5\frac{6}{9} + 4\frac{5}{9} + 2\frac{8}{9}$
3. $9\frac{2}{11} + 8\frac{9}{11} + 5\frac{7}{11} + 6\frac{10}{11}$

Extra Practice

Worksheet A61

Pages 320-321

Add.

1. $3\frac{1}{5} + 4\frac{2}{5} = 7\frac{3}{5}$
2. $3\frac{3}{5} + 4\frac{2}{5} = 8$
3. $3\frac{3}{5} + 4\frac{3}{5} = 8\frac{1}{5}$
4. $1\frac{3}{8} + 3\frac{7}{8} = 5\frac{2}{8}$
5. $2\frac{4}{9} + 3\frac{5}{9} = 6$
6. $3\frac{6}{10} + 4\frac{8}{10} = 8\frac{4}{10}$
7. $6\frac{3}{4} + 4\frac{3}{4} = 11\frac{2}{4}$
8. $6\frac{3}{10} + 5\frac{9}{10} = 12\frac{2}{10}$
9. $3\frac{9}{10} + 4\frac{8}{10} = 8\frac{7}{10}$
10. $3\frac{3}{10} + 2\frac{8}{10} = 6\frac{1}{10}$
11. $5\frac{9}{10} + 3\frac{7}{10} = 9\frac{6}{10}$
12. $5\frac{2}{10} + 4\frac{9}{10} = 10\frac{1}{10}$

PRACTICE

Subtract.

1. $4 - \frac{1}{8} = 3\frac{7}{8}$
2. $5 - \frac{1}{2} = 4\frac{1}{2}$
3. $3 - \frac{2}{5} = 2\frac{3}{5}$
4. $7 - \frac{2}{3} = 6\frac{1}{3}$
5. $8 - \frac{3}{5} = 7\frac{2}{5}$
6. $6 - \frac{7}{8} = 5\frac{1}{8}$
7. $8 - \frac{1}{6} = 7\frac{5}{6}$
8. $9 - \frac{3}{4} = 8\frac{1}{4}$
9. $12 - \frac{4}{7} = 11\frac{3}{7}$
10. $11 - \frac{3}{10} = 10\frac{7}{10}$
11. $7 - \frac{5}{16} = 6\frac{11}{16}$
12. $5 - \frac{1}{9} = 4\frac{8}{9}$
13. $9 - \frac{1}{10} = 8\frac{9}{10}$
14. $6 - \frac{5}{12} = 5\frac{7}{12}$
15. $5 - \frac{7}{10} = 4\frac{3}{10}$
16. $7 - \frac{7}{9} = 6\frac{2}{9}$
17. $8 - \frac{5}{6} = 7\frac{1}{6}$
18. $12 - \frac{3}{4} = 11\frac{1}{4}$
19. $10 - \frac{5}{12} = 9\frac{7}{12}$
20. $14 - \frac{3}{10} = 13\frac{7}{10}$

Solve.

21. The Sagars set out on a 7-day holiday. They spent $\frac{1}{2}$ day driving to a provincial park.
How much of their holiday was left? $6\frac{1}{2}$ days
22. The Sagars planned to spend 2 days at a provincial park, but it took $\frac{1}{6}$ of a day to get a camp site. How much of the 2 days was left? $1\frac{5}{6}$ days

Holiday Count

Paul has 9 weeks of summer holidays. He will be at his grandparents for 4 days and at camp for 13 days. How many **weeks** will he have left?

$6\frac{4}{7}$ weeks



323

Assigning the Practice

Minimum: 1-16, 21

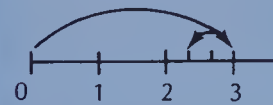
Average: 5-22

Enriched: 5-22

Reinforcement

1. Label one die with six whole numbers. Label a second die with six fractions. Students working in pairs can take turns rolling the dice and computing the differences.

2. Ask the students to study the following number line drawing illustrating the subtraction $3 - \frac{2}{3} = 2\frac{1}{3}$. Then have them make similar drawings for the listed subtractions.



$$3 - \frac{2}{3} = 2\frac{1}{3}$$

- | | |
|-----------------------|----------------------|
| a. $6 - \frac{5}{6}$ | b. $4 - \frac{2}{3}$ |
| c. $11 - \frac{4}{7}$ | d. $2 - \frac{3}{4}$ |
| e. $5 - \frac{1}{2}$ | f. $3 - \frac{1}{8}$ |

Enrichment

Assign *Holiday Count* at the bottom of page 323.

Extra Practice

Worksheet A62

Pages 322-323

Subtract.

- | | | | |
|---------------------------------------|--|--|--|
| 1. $2 - \frac{1}{6} = 1\frac{5}{6}$ | 2. $3 - \frac{1}{5} = 2\frac{4}{5}$ | 3. $4 - \frac{1}{6} = 3\frac{5}{6}$ | 4. $7 - \frac{3}{6} = 6\frac{3}{6}$ |
| 5. $9 - \frac{4}{10} = 8\frac{6}{10}$ | 6. $10 - \frac{5}{12} = 9\frac{7}{12}$ | 7. $11 - \frac{3}{16} = 10\frac{13}{16}$ | 8. $9 - \frac{6}{8} = 8\frac{2}{8}$ |
| 9. $9 - \frac{3}{7} = 8\frac{4}{7}$ | 10. $8 - \frac{1}{10} = 7\frac{9}{10}$ | 11. $6 - \frac{7}{10} = 5\frac{3}{10}$ | 12. $5 - \frac{9}{10} = 4\frac{1}{10}$ |

UNIT 14 LESSON 6

Objective A63

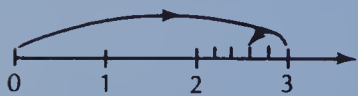
Subtract mixed numerals with like denominators.

Introducing the Lesson

Give each student a sheet of number lines. Have them illustrate previously learned subtractions, similar to the following, on the number lines.



$$2 - \frac{3}{4} = 1\frac{1}{4}$$



$$3 - \frac{2}{5} = 2\frac{3}{5}$$



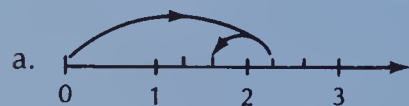
$$2 - \frac{1}{3} = 1\frac{2}{3}$$

Teaching the Lesson

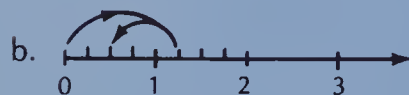
Have the students complete the following regrouping examples.

$$\begin{array}{r} 3\frac{2}{3} \\ - 1\frac{1}{3} \\ \hline 2\frac{1}{3} \end{array}$$

Ask the students to illustrate subtractions similar to the following on a number line. Once the difference has been found with arrow jumps, explain how the subtraction is recorded. Stress the regrouping step.



$$2\frac{2}{3} - \frac{2}{3} = 1\frac{2}{3}$$



$$1\frac{1}{4} - \frac{3}{4} = \frac{2}{4}$$

Read and discuss the lesson example at the top of page 324. Point out that the answer, $2\frac{2}{4}$, in simplest terms is $2\frac{1}{2}$. (Students are not required to simplify answers at this time.)

Subtracting with Mixed Numerals

During the summer, Rachel filled $3\frac{1}{4}$ pages of her stamp album. Then she gave away the stamps on $\frac{3}{4}$ of a page. How many pages of stamps did she have left?



$$\begin{array}{r} 3\frac{1}{4} \\ - \frac{3}{4} \\ \hline \end{array}$$

Regroup.

$$\begin{array}{r} 2\frac{5}{4} \\ 3\frac{1}{4} \\ - \frac{3}{4} \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 2\frac{5}{4} \\ 3\frac{1}{4} \\ - \frac{3}{4} \\ \hline 2\frac{2}{4} \end{array}$$

Rachel had $2\frac{2}{4}$ pages of stamps left.

Can you think of a simpler way to say $\frac{2}{4}$?

EXERCISES

Subtract

$$\begin{array}{r} 1. \quad 2\frac{5}{6} \\ - \frac{4}{6} \\ \hline 2\frac{1}{6} \end{array}$$

$$\begin{array}{r} 2. \quad 7\frac{7}{8} \\ - \frac{5}{8} \\ \hline 7\frac{2}{8} \end{array}$$

$$\begin{array}{r} 3. \quad 5\frac{3}{4} \\ - \frac{2}{4} \\ \hline 5\frac{1}{4} \end{array}$$

$$\begin{array}{r} 4. \quad 9\frac{5}{10} \\ - \frac{2}{10} \\ \hline 9\frac{3}{10} \end{array}$$

Subtract. Regroup if necessary.

$$\begin{array}{r} 5. \quad 2\frac{4}{6} \\ - 1\frac{5}{6} \\ \hline 1\frac{3}{6} \end{array}$$

$$\begin{array}{r} 6. \quad 7\frac{1}{8} \\ - 2\frac{7}{8} \\ \hline 4\frac{2}{8} \end{array}$$

$$\begin{array}{r} 7. \quad 5\frac{1}{5} \\ - 3\frac{4}{5} \\ \hline 1\frac{2}{5} \end{array}$$

$$\begin{array}{r} 8. \quad 8\frac{3}{9} \\ - 3\frac{5}{9} \\ \hline 4\frac{7}{9} \end{array}$$

$$\begin{array}{r} 9. \quad 4 \\ - 2\frac{1}{4} \\ \hline 1\frac{3}{4} \end{array}$$

$$\begin{array}{r} 10. \quad 7\frac{1}{4} \\ - \frac{2}{4} \\ \hline 6\frac{3}{4} \end{array}$$

$$\begin{array}{r} 11. \quad 4\frac{4}{10} \\ - 1\frac{2}{10} \\ \hline 3\frac{2}{10} \end{array}$$

$$\begin{array}{r} 12. \quad 5\frac{1}{6} \\ - 2\frac{2}{6} \\ \hline 2\frac{5}{6} \end{array}$$

$$13. \quad 8 - 3\frac{3}{5} = 4\frac{2}{5}$$

$$14. \quad 6\frac{2}{5} - \frac{4}{5} = 5\frac{3}{5}$$

$$15. \quad 5\frac{1}{8} - 2\frac{7}{8} = 2\frac{2}{8}$$

$$16. \quad 9\frac{2}{7} - 4\frac{5}{7} = 4\frac{4}{7}$$

$$17. \quad 9\frac{5}{10} - 3\frac{7}{10} = 5\frac{8}{10}$$

$$18. \quad 8\frac{3}{7} - 7\frac{5}{7} = 7\frac{5}{7}$$

$$19. \quad 7\frac{4}{6} - 3\frac{1}{6} = 4\frac{3}{6}$$

$$20. \quad 5\frac{7}{9} - 2\frac{3}{9} = 3\frac{4}{9}$$

324

Using the Exercises

- Questions 1 to 4 do not require any regrouping.
- Some of questions 5 to 20 require regrouping. Students can use number lines to check their answers.

PRACTICE

Subtract.

1. $4\frac{3}{4} - 3\frac{1}{4} = 1\frac{2}{4}$
2. $8\frac{5}{8} - \frac{7}{8} = 7\frac{6}{8}$
3. $7\frac{4}{5} - 2\frac{2}{5} = 5\frac{2}{5}$
4. $9\frac{1}{8} - 7\frac{5}{8} = 1\frac{4}{8}$
5. $8\frac{5}{6} - \frac{3}{6} = 8\frac{2}{6}$
6. $2\frac{2}{7} - \frac{5}{7} = 1\frac{4}{7}$
7. $9\frac{2}{3} - 1\frac{1}{3} = 8\frac{1}{3}$
8. $7\frac{2}{5} - 3\frac{4}{5} = 3\frac{3}{5}$
9. $7 - 5\frac{1}{9} = 1\frac{8}{9}$
10. $8 - 4\frac{7}{10} = 3\frac{3}{10}$
11. $4\frac{3}{10} - 1\frac{6}{10} = 2\frac{7}{10}$
12. $6\frac{5}{12} - 2\frac{7}{12} = 3\frac{10}{12}$

Solve.

13. The estimated cost of building a theme park was $12\frac{3}{8}$ million dollars. The actual cost was $18\frac{7}{8}$ million dollars. How much more was the actual cost? $6\frac{4}{8}$ million dollars

USING THE CALCULATOR

Fractions can be added or subtracted on a calculator by changing them to decimals first. For each fraction, divide the numerator by the denominator. Then add or subtract the decimals.

$$\begin{array}{r} \frac{3}{8} \\ + \frac{7}{8} \\ \hline \end{array} \quad \begin{array}{l} 3 \div 8 = 0.375 \\ 7 \div 8 = 0.875 \\ \hline \end{array} \quad \begin{array}{r} 0.375 \\ + 0.875 \\ \hline 1.250 \end{array}$$



Add or subtract these fractions. Use a calculator.

- a. $\frac{3}{4} + \frac{3}{4} = 1.5$
- b. $\frac{3}{5} + \frac{4}{5} = 1.4$
- c. $\frac{14}{16} - \frac{11}{16} = 0.1875$
- d. $\frac{42}{35} + \frac{49}{35} = 2.6$
- e. $\frac{43}{8} - \frac{27}{8} = 2$

325

Extra Practice

Subtract.

1. $6 - 3\frac{2}{7} = 2\frac{5}{7}$
2. $6 - 3\frac{1}{3} = 2\frac{2}{3}$
3. $8\frac{4}{5} - 3\frac{2}{5} = 5\frac{2}{5}$
4. $12\frac{3}{10} - 2\frac{1}{10} = 10\frac{2}{10}$
5. $5\frac{5}{6} - 3\frac{4}{6} = 2\frac{1}{6}$
6. $8\frac{7}{8} - 2\frac{5}{8} = 6\frac{2}{8}$
7. $7\frac{11}{12} - 4\frac{5}{12} = 3\frac{6}{12}$
8. $6 - 2\frac{5}{12} = 3\frac{7}{12}$
9. $8 - 3\frac{4}{10} = 4\frac{6}{10}$
10. $3\frac{3}{10} - 1\frac{6}{10} = 1\frac{7}{10}$
11. $5\frac{4}{10} - 3\frac{7}{10} = 1\frac{7}{10}$
12. $8\frac{5}{10} - 7\frac{6}{10} = \frac{9}{10}$

Worksheet A63

Pages 324-325

Assigning the Practice

Minimum: 1-13

Average: 1-13

Enriched: 1-13

Reinforcement

1. Have the students complete the following cross-number puzzles.

→		
⊖	→	
↓	12 $\frac{1}{3}$	2 $\frac{2}{3}$
	9	1 $\frac{1}{3}$

→		
⊖	→	
↓	15 $\frac{1}{4}$	3 $\frac{3}{4}$
	8	1 $\frac{1}{4}$

→		
⊖	→	
↓	8 $\frac{3}{5}$	4 $\frac{4}{5}$
	2 $\frac{2}{5}$	1 $\frac{1}{5}$

→		
⊖	→	
↓	20 $\frac{4}{7}$	5 $\frac{5}{7}$
	2 $\frac{2}{7}$	1 $\frac{1}{7}$

2. Ask the students to find the missing numbers.

- a. $\begin{array}{r} \blacksquare \\ - 2\frac{3}{8} \\ \hline 2\frac{2}{8} \end{array}$
- b. $\begin{array}{r} 5\frac{5}{8} \\ - \blacksquare \\ \hline 1\frac{1}{8} \end{array}$
- c. $\begin{array}{r} 4 \\ - \blacksquare \\ \hline 2\frac{5}{8} \end{array}$
- d. $\begin{array}{r} \blacksquare \\ - \frac{7}{8} \\ \hline 3\frac{1}{8} \end{array}$

Enrichment

1. Assign *Using the Calculator* at the bottom of page 325.
2. Ask, "Which of the following are equal to $5\frac{3}{5}$: $6\frac{1}{5}$, $4\frac{8}{5}$, $3\frac{13}{5}$, $4\frac{5}{6}$, $\frac{28}{5}$?"

Objective A64

Understand the meaning of probability; find probabilities.

Introducing the Lesson

Have the students discuss the meaning and reasons for such statements as, "It probably will not rain today", or "I probably will win the race." Point out that probability is a prediction of the occurrence or non-occurrence of an event. Ask, "What is the probability that you will attend school on a Monday during the school year?" The probability of this event occurring is 1, or $\frac{1}{1}$, or 100%. Ask, "What is the probability that you will attend school on Saturday during the school year?" The probability of this event occurring is 0, or $\frac{0}{1}$ or 0%.

Teaching the Lesson

Read and discuss the top of page 326. Explain how the probability that a particular name will be drawn is 1 in 3 or $\frac{1}{3}$ since there are three names in all and only one is drawn at a time.

Give the students materials to simulate this situation. Ask them to place 3 names in a hat and draw 60 times. Show them how to tally their results which might look like the following.

Tom	### ### ###
Joe	### ### ### ###
Dick	### ### ### ###

$$\frac{19 \text{ Tom}}{60 \text{ in all}}$$

$$\frac{21 \text{ Joe}}{60 \text{ in all}}$$

$$\frac{20 \text{ Dick}}{60 \text{ in all}}$$

Point out that each fraction ($\frac{19}{60}$, $\frac{21}{60}$, and $\frac{20}{60}$) is either close to or equal to $\frac{1}{3}$.

Discuss these probabilities and compare them to the name-drawing results.

Probability

John, Mario, and Eric all wanted to go to the beach with Stefanie. She decided to put their names in a hat and draw one to see who she would take.



What were John's chances of getting picked?

There are 3 names. One gets chosen.

The **probability** (chance) of being chosen is 1 in 3 or $\frac{1}{3}$.

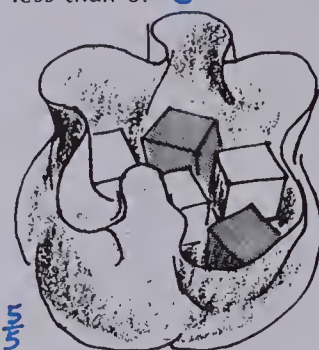
EXERCISES

There are six faces on a die. Each face has a numeral from one to six.

1. What is the probability of rolling a 1? $\frac{1}{6}$
2. What is the probability of rolling a 5? $\frac{1}{6}$
3. What is the probability of rolling an even number? $\frac{3}{6}$
4. What is the probability of rolling an odd number? $\frac{3}{6}$
5. What is the probability of rolling a number less than 6? $\frac{5}{6}$

There are 2 blue blocks, 1 white block, and 2 gray blocks in a bag. You pick a block without looking. What is the probability that the block will be:

6. white $\frac{1}{5}$
7. gray $\frac{2}{5}$
8. blue or white $\frac{3}{5}$
9. gray or white $\frac{3}{5}$
10. blue or gray $\frac{4}{5}$
11. blue, white, or gray? $\frac{5}{5}$



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Using the Exercises

- Questions 1 to 5 deal with the probabilities of rolling a certain number or numbers on a die. Have the students predict the probabilities of these events. Then provide pairs of students with a die to prove their predictions. Ask them to roll the die 60 times. Discuss and graph the results. Point out how rolling a number 10 times in 60 is the same as what was predicted, 1 in 6, or $\frac{10}{60} = \frac{1}{6}$.
- Questions 6 to 11 involve the probabilities of choosing certain coloured blocks in a bag. After the students predict the probabilities of these events, give them similar materials to prove their predictions. Ask them to choose a coloured block 60 times and tally their choices. Then discuss the results. Point out that the chances of choosing e.g., a gray block, were predicted to be 1 in 4. Their experiment probably resulted in 15 times in 60; or what was predicted, since $\frac{15}{60} = \frac{1}{4}$.

PRACTICE

Suppose you shuffled these cards and then placed them face down.

1 2 3 4 5 6 7 8

The top card is turned over. What is the probability that it is:

- a 3 $\frac{1}{8}$
- a 6 or a 7 $\frac{2}{8}$
- a numeral greater than 4 $\frac{4}{8}$
- an odd numeral $\frac{4}{8}$
- a numeral less than 6 $\frac{5}{8}$
- an even numeral? $\frac{4}{8}$
- Suppose a penny is flipped 50 times.
How many heads do you think there would be? about 25
- If you flip a penny, what is the probability of getting a head? $\frac{1}{2}$
- If you flip a penny, what is the probability of getting neither a head nor a tail? 0
- You have 3 red marbles and 2 blue marbles in your pocket.
If you take out one marble, what is the probability that the marble will be:
a. blue $\frac{2}{5}$ b. red $\frac{3}{5}$ c. either red or blue? $\frac{5}{5}$
- In a Grade 5 class, there are 16 girls and 14 boys.
What is the probability that a student, chosen at random, will be a girl? $\frac{16}{30}$

Flipped Out

Flip a penny 50 times. Record the number of heads and the number of tails. Record the results.

Heads	
Tails	



327

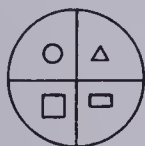
Extra Practice

A bag contains 1 red stick and 1 black stick.
What is the probability of picking:

- a red stick? $\frac{1}{2}$
- a black stick? $\frac{1}{2}$
- a green stick? 0

A spinner with a pointer is pinned at the centre of this card.
What is the probability that the pointer will stop:

- on a square? $\frac{1}{4}$
- on a circle? $\frac{1}{4}$
- on a rectangle? (Be careful.) $\frac{2}{4}$



Worksheet A64

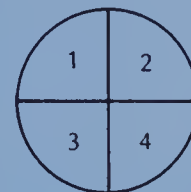
Pages 326-327

Assigning the Practice

Minimum: 1-9
Average: 1-10
Enriched: 1-11

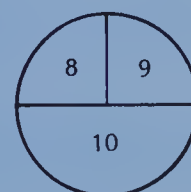
Reinforcement

1. Provide pairs of students with spinners as shown below. Have them predict the outcomes by naming beforehand the probabilities of spinning a 2; a 5; either a 2 or a 3; either a 1 or a 2, or a 3 or a 4. Then have them prove their predictions by spinning 60 times, tallying the results, and comparing them to the predictions.



2. Assign *Flipped Out* at the bottom of page 327. Have pairs of students work together in determining the probabilities before the experiment. Flip a penny 50 times and tally the results. Compare the results to the probability predictions.

3. Have pairs of students make a spinner, as shown below, and predict possible outcomes. Spin the spinner 80 times, tally the results, and compare the results to the probability predictions.



Enrichment

Have pairs of students make 5 numeral cards: 3, 6, 9, 12, and 15. If the cards are placed face down on a table, what are the probabilities that a 6 is turned over? a 12 is turned over? a 14 is turned over? a number less than 10 is turned over? a number less than 16 is turned over?

After these questions have been answered, have the students turn over the cards 50 times, tally, and compare the results to the predictions.

Objective PS14

Solve problems involving fractions and decimals.

Introducing the Lesson

Write the following expressions on the chalkboard. Ask the students to devise a story problem that uses these facts. Record the story problems on the chalkboard.

- a. $1\frac{1}{2} + 1\frac{1}{2}$ b. $47.5 - 18.7$
 c. $5 - 1\frac{1}{10}$ d. 6.28×7

Teaching the Lesson

Read and discuss the problem at the top of page 328. Work through the four **IDEA** steps as shown in the example. Point out that the sum $27\frac{7}{4}$ was simplified as $28\frac{3}{4}$. Have the students determine how much money is $\frac{3}{4}$ million dollars and $28\frac{3}{4}$ million dollars.

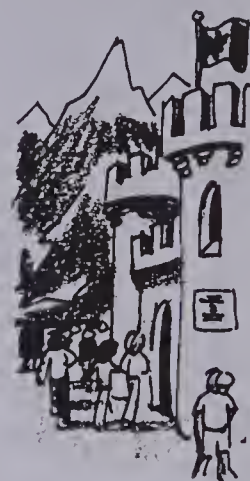
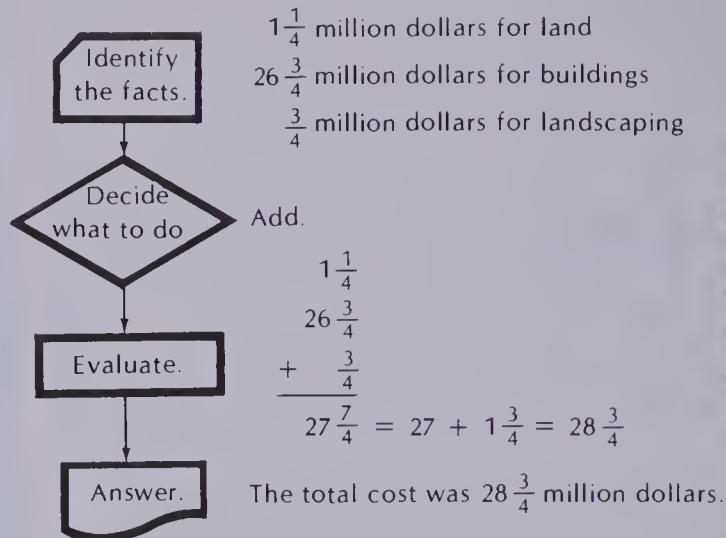
Solve the problems devised by the students in Introducing the Lesson using the **IDEA** strategy. Review fraction and decimal computation skills as the solutions to the problems are found. Point out how the solutions to some problems can be computed as fractions or as decimals.

a.
$$\begin{array}{r} 1\frac{1}{2} \\ + 1\frac{1}{2} \\ \hline 2\frac{2}{2} = 3 \end{array}$$
 OR
$$\begin{array}{r} 1.5 \\ + 1.5 \\ \hline 3.0 \end{array}$$

b.
$$\begin{array}{r} 4\frac{10}{10} \\ - 1\frac{1}{10} \\ \hline 3\frac{9}{10} \end{array}$$
 OR
$$\begin{array}{r} 4.0 \\ - 1.1 \\ \hline 2.9 \end{array}$$

Problem Solving

The land for a theme park cost $1\frac{1}{4}$ million dollars. It cost $26\frac{3}{4}$ million dollars to construct the buildings and another $\frac{3}{4}$ million dollars to landscape the park. What was the total cost?



EXERCISES

Solve.

- Tony bought 2 dozen buns for a picnic. After the picnic, $\frac{1}{4}$ dozen buns were left over. How many buns were eaten? **$1\frac{3}{4}$ dozen or 21**
- Miriam put 24.5 L of gas in the tank of her car. Then she put in 0.7 L more. How much gas did she put in the car? **25.2 L**
- Carla worked as a mother's helper for 2 weeks in the summer. She had $1\frac{1}{2}$ days off. How many days did she work? **$12\frac{1}{2}$ days**
- Tim spent $1\frac{1}{3}$ days cleaning Mrs. Zaff's yard, $\frac{2}{3}$ day cleaning Schutter's basement, and $\frac{1}{3}$ day mowing the Sharp's lawn. How much time did these three jobs take? **$2\frac{1}{3}$ days**

Using the Exercises

- Do questions 1 and 2 on page 328 together. Questions 3 and 4 can be done independently. Check the students' responses before going on to the Practice exercises on page 329.

PRACTICE

Solve.

1. What is the total area covered by the Great Lakes?

$244\ 110\text{ km}^2$

	Area (1000 km ²)
Lake Superior	82 1
Lake Huron	59 57
Lake Michigan	57 76
Lake Erie	25 68
Lake Ontario	19 0

2. The average July temperature for Gander is 16.5°C and for Charlottetown 18.4°C . What is the difference in the average July temperatures for these two places?

1.9°C

3. Ted ate $\frac{5}{8}$ of his candy bar and Ed ate $\frac{3}{8}$ of his. They gave the rest to Anders. How much did Anders get altogether?

$\frac{8}{8}$

4. The Connelllys spent $2\frac{2}{3}$ days of their holiday in Cape Breton and $1\frac{1}{3}$ days in Halifax. How many days was that?

4 days

REVIEW

Subtract.

A62

1. $6 - \frac{3}{8}$

$5\frac{5}{8}$

2. $1 - \frac{3}{4}$

$\frac{1}{4}$

3. $5 - \frac{7}{10}$

$4\frac{3}{10}$

4. $3 - \frac{3}{5}$

$2\frac{2}{5}$

A63

5. $4 - 1\frac{1}{5}$

$2\frac{4}{5}$

6. $8\frac{1}{6} - \frac{4}{6}$

$7\frac{3}{6}$

7. $9\frac{4}{7} - 3\frac{2}{7}$

$6\frac{2}{7}$

8. $8\frac{7}{9} - 5\frac{8}{9}$

$2\frac{8}{9}$

Solve.

A bag has 3 red marbles, 2 blue marbles, and 1 green marble.

A64

If you took one out, what is the probability of getting:

9. a green marble? $\frac{1}{6}$

10. a red marble? $\frac{3}{6}$

11. a blue or a red marble? $\frac{5}{6}$

329

Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

Review Exercises

Questions	Objective	Pages
1-4	A62	322-323
5-8	A63	324-325
9-11	A64	326-327

Reinforcement

1. Have the students fill in the missing numbers.

a. $2\frac{1}{2} + \frac{\blacksquare}{5}$

b. $9.2 - \frac{\blacksquare}{4.7}$

c. $5\frac{7}{12} + \frac{\blacksquare}{8\frac{1}{12}}$

d. $3.21 - \frac{\blacksquare}{5.79}$

e. $9\frac{1}{8} - \frac{\blacksquare}{6}$

f. $12.7 + \frac{\blacksquare}{19.0}$

2. Write the following on the chalkboard. Have the students devise word problems using these facts. Record the problems on cards for the rest of the class to solve.

a. $23.6\text{ L} + 41.9\text{ L}$

b. $6\frac{1}{2}\text{ h} + 3\frac{1}{2}\text{ h}$

c. $7\text{ weeks} - 4\text{ days}$

d. $\frac{1}{3}\text{ h} + 2\text{ h} + \frac{2}{3}\text{ h}$

e. $4\text{ dozen} - 2\frac{1}{4}\text{ dozen}$

f. $37.5^\circ\text{C} - 0.8^\circ\text{C}$

g. $6\text{ years} + 4\frac{1}{2}\text{ years} + \frac{3}{4}\text{ years}$

h. $35.2\text{ kg} + 3.9\text{ kg}$

Enrichment

Have the students devise an addition equation, using fractions with a denominator of 24, which tells of the amount of time they spent in doing different activities in one day.

$$\begin{array}{r} \frac{9}{24} \text{ sleeping} \\ \frac{2}{24} \text{ eating} \\ \frac{3}{24} \text{ watching TV} \\ \frac{7}{24} \text{ school} \\ \frac{1}{24} \text{ sports} \\ \frac{1}{24} \text{ homework} \\ + \frac{1}{24} \text{ visit a friend} \\ \hline \frac{24}{24} = 1 \text{ day} \end{array}$$

Extra Practice

Worksheet PS14

Pages 328-329

Solve the following problems.

1. The gas gauge in Pat's car moved from the full mark to the $\frac{1}{4}$ full mark when she drove to Regina. What fraction of a tank did she use? $\frac{3}{4}$

2. Trudy studied each of her six subjects for a half hour over the weekend. How long did she study altogether? $\frac{6}{2}$ or 3 h

3. The interest rate for consumer loans just increased by $1\frac{1}{4}$ percent. If the old rate was $12\frac{1}{2}$ percent, what is the new rate? $13\frac{3}{4}$

4. On the stock market, the shares of a clothing company went up $\$4\frac{1}{2}$ to $\$25$. What was the initial price? $\$20\frac{1}{2}$

Unit 14 Objective	Test Questions	Pages
A59	1-5	314-315
A60	6-10	316-317
N23	11-20	318-319
A61	21-25	320-321
A62	26-30	322-323
A63	31-35	324-325
A64	36, 37	326-327

TEST

UNIT 14

Add or subtract.

$$\begin{array}{r} 1. \quad \frac{4}{6} \\ + \frac{1}{6} \\ \hline \frac{5}{6} \end{array} \quad \begin{array}{r} 2. \quad \frac{2}{10} \\ + \frac{5}{10} \\ \hline \frac{7}{10} \end{array} \quad \begin{array}{r} 3. \quad \frac{5}{100} \\ + \frac{4}{100} \\ \hline \frac{9}{100} \end{array} \quad \begin{array}{r} 4. \quad \frac{1}{5} \\ + \frac{1}{5} \\ \hline \frac{2}{5} \end{array} \quad \begin{array}{r} 5. \quad \frac{6}{12} \\ + \frac{4}{12} \\ \hline \frac{10}{12} \end{array}$$

$$\begin{array}{r} 6. \quad \frac{7}{9} \\ - \frac{2}{9} \\ \hline \frac{5}{9} \end{array} \quad \begin{array}{r} 7. \quad \frac{10}{12} \\ - \frac{3}{12} \\ \hline \frac{7}{12} \end{array} \quad \begin{array}{r} 8. \quad \frac{6}{8} \\ - \frac{1}{8} \\ \hline \frac{5}{8} \end{array} \quad \begin{array}{r} 9. \quad \frac{11}{20} \\ - \frac{3}{20} \\ \hline \frac{8}{20} \end{array} \quad \begin{array}{r} 10. \quad \frac{14}{15} \\ - \frac{8}{15} \\ \hline \frac{6}{15} \end{array}$$

Write the mixed numeral.

$$11. \quad \frac{6}{5} \quad 1\frac{1}{5} \quad 12. \quad \frac{9}{7} \quad 1\frac{2}{7} \quad 13. \quad \frac{11}{8} \quad 1\frac{3}{8} \quad 14. \quad \frac{10}{3} \quad 3\frac{1}{3} \quad 15. \quad \frac{16}{5} \quad 3\frac{1}{5}$$

Write the fraction.

$$16. \quad 1\frac{1}{2} \quad \frac{3}{2} \quad 17. \quad 1\frac{3}{4} \quad \frac{7}{4} \quad 18. \quad 1\frac{3}{6} \quad \frac{9}{6} \quad 19. \quad 2\frac{3}{10} \quad \frac{23}{10} \quad 20. \quad 4\frac{1}{5} \quad \frac{21}{5}$$

Add.

$$\begin{array}{r} 21. \quad 5\frac{3}{5} \\ + 2\frac{2}{5} \\ \hline 7\frac{5}{5} = 8 \end{array} \quad \begin{array}{r} 22. \quad 1\frac{3}{8} \\ + 3\frac{4}{8} \\ \hline 4\frac{7}{8} \end{array} \quad \begin{array}{r} 23. \quad 7\frac{6}{10} \\ + 6\frac{5}{10} \\ \hline 13\frac{11}{10} = 14\frac{1}{10} \end{array} \quad \begin{array}{r} 24. \quad 4\frac{3}{4} \\ + 1\frac{3}{4} \\ \hline 5\frac{6}{4} = 6\frac{2}{4} \end{array} \quad \begin{array}{r} 25. \quad 6\frac{4}{9} \\ + 3\frac{7}{9} \\ \hline 9\frac{11}{9} = 10\frac{2}{9} \end{array}$$

Subtract.

$$\begin{array}{r} 26. \quad 7 \\ - \frac{7}{16} \\ \hline 6\frac{9}{16} \end{array} \quad \begin{array}{r} 27. \quad 4 \\ - \frac{1}{8} \\ \hline 3\frac{7}{8} \end{array} \quad \begin{array}{r} 28. \quad 3 \\ - \frac{2}{3} \\ \hline 2\frac{1}{3} \end{array} \quad \begin{array}{r} 29. \quad 5 \\ - \frac{7}{12} \\ \hline 4\frac{5}{12} \end{array} \quad \begin{array}{r} 30. \quad 6 \\ - \frac{6}{9} \\ \hline 5\frac{8}{9} \end{array}$$

$$\begin{array}{r} 31. \quad 8 \\ - 2\frac{2}{5} \\ \hline 5\frac{3}{5} \end{array} \quad \begin{array}{r} 32. \quad 6\frac{2}{5} \\ - \frac{4}{5} \\ \hline 5\frac{3}{5} \end{array} \quad \begin{array}{r} 33. \quad 8\frac{3}{10} \\ - 3\frac{1}{10} \\ \hline 5\frac{2}{10} \end{array} \quad \begin{array}{r} 34. \quad 9\frac{2}{6} \\ - 7\frac{3}{6} \\ \hline 1\frac{5}{6} \end{array} \quad \begin{array}{r} 35. \quad 7\frac{4}{7} \\ - 2\frac{6}{7} \\ \hline 4\frac{5}{7} \end{array}$$

Solve.

You are in line to buy a ticket. There are three ticket sellers: A, B, and C. What is the probability you will get:

$$36. \quad \text{seller A} \quad \frac{1}{3} \quad 37. \quad \text{either seller B or C?} \quad \frac{2}{3}$$

330

Post-test

Unit 14

Add or subtract.

$$\begin{array}{r} 1. \quad \frac{1}{4} \\ + \frac{2}{4} \\ \hline \frac{3}{4} \end{array} \quad \begin{array}{r} 2. \quad \frac{5}{9} \\ + \frac{2}{9} \\ \hline \frac{7}{9} \end{array} \quad \begin{array}{r} 3. \quad \frac{3}{5} \\ + \frac{2}{5} \\ \hline \frac{5}{5} \end{array} \quad \begin{array}{r} 4. \quad \frac{7}{18} \\ + \frac{10}{18} \\ \hline \frac{17}{18} \end{array} \quad \begin{array}{r} 5. \quad \frac{6}{11} \\ + \frac{3}{11} \\ \hline \frac{9}{11} \end{array}$$

$$\begin{array}{r} 6. \quad \frac{2}{3} \\ - \frac{1}{3} \\ \hline \frac{1}{3} \end{array} \quad \begin{array}{r} 7. \quad \frac{9}{14} \\ - \frac{5}{14} \\ \hline \frac{4}{14} \end{array} \quad \begin{array}{r} 8. \quad \frac{19}{24} \\ - \frac{12}{24} \\ \hline \frac{7}{24} \end{array} \quad \begin{array}{r} 9. \quad \frac{7}{8} \\ - \frac{7}{8} \\ \hline 0 \end{array} \quad \begin{array}{r} 10. \quad \frac{16}{25} \\ - \frac{11}{25} \\ \hline \frac{5}{25} \end{array}$$

Write the mixed numeral.

$$11. \quad \frac{11}{10} \quad 1\frac{1}{10} \quad 12. \quad \frac{6}{5} \quad 1\frac{1}{5} \quad 13. \quad \frac{9}{4} \quad 2\frac{1}{4} \quad 14. \quad \frac{12}{7} \quad 1\frac{5}{7} \quad 15. \quad \frac{16}{3} \quad 5\frac{1}{3}$$

Write the fraction.

$$16. \quad 1\frac{1}{3} \quad \frac{4}{3} \quad 17. \quad 1\frac{4}{5} \quad \frac{9}{5} \quad 18. \quad 2\frac{3}{4} \quad \frac{11}{4} \quad 19. \quad 2\frac{7}{9} \quad \frac{25}{9} \quad 20. \quad 3\frac{5}{6} \quad \frac{23}{6}$$

Find the LCM (least common multiple).

1. 6 and 9 **18** 2. 8 and 10 **40** 3. 7 and 11 **77**
4. 3 and 12 **12** 5. 13 and 5 **65** 6. 12 and 18 **36**

7. Which number is divisible by 9?

- a. 2276 b. 1505 c. **1557** d. 2783

8. Which number is divisible by both 2 and 5?

- a. 2388 b. 2005 c. **2430** d. 6052

9. Write the first six prime numbers.

2, 3, 5, 7, 11, 13

10. Write the first six composite numbers.

4, 6, 8, 9, 10, 12

Find the GCF (greatest common factor).

11. 8 and 16 **8** 12. 6 and 9 **3** 13. 12 and 15 **3**
14. 4 and 5 **1** 15. 10 and 25 **5** 16. 12 and 18 **6**

Evaluate.

17. $46 - (4 + 2)$ **40** 18. $6 \times 13 - 6$ **72** 19. $8 + 4 \div 2$ **10**
20. $36 \div (18 - 9)$ **4** 21. $(4 + 6) \times 89$ **890** 22. $(3 + 6) \times 8 - 2$ **70**
23. $75 + 97 + 25$ **197** 24. $2 \times 89 \times 50$ **8900** 25. 12×21 **252**
26. 4×99 **396** 27. $123 + 259 - 23$ **359** 28. 101×28 **2828**

Write the standard numeral.

29. IX **9** 30. CCXX **220** 31. MXC **1090**

Add.

21. $4\frac{2}{3} + 3\frac{1}{3}$ **8** 22. $6\frac{1}{5} + 9\frac{2}{5}$ **15\frac{3}{5}** 23. $9\frac{7}{9} + 8\frac{8}{9}$ **17\frac{15}{9} = 18\frac{6}{9}** 24. $2\frac{3}{8} + 7\frac{7}{8}$ **9\frac{10}{8} = 10\frac{2}{8}** 25. $6\frac{5}{12} + 11\frac{9}{12}$ **17\frac{14}{12} = 18\frac{2}{12}**

Subtract.

26. $5 - \frac{1}{5}$ **4\frac{4}{5}** 27. $7 - \frac{3}{4}$ **6\frac{1}{4}** 28. $6 - \frac{3}{5}$ **5\frac{2}{5}** 29. $11 - \frac{8}{9}$ **10\frac{1}{9}** 30. $1 - \frac{13}{14}$ **\frac{1}{14}**
31. $7 - 6\frac{5}{6}$ **\frac{1}{6}** 32. $9\frac{7}{9} - \frac{8}{9}$ **8\frac{8}{9}** 33. $2\frac{7}{8} - 1\frac{5}{8}$ **1\frac{2}{8}** 34. $5\frac{1}{4} - 2\frac{3}{4}$ **2\frac{2}{4}** 35. $10\frac{5}{12} - 3\frac{7}{12}$ **6\frac{10}{12}**

Solve.

There are 2 green blocks, 1 blue block, and 3 red blocks in a bag. What is the probability of picking:

36. a blue block? **\frac{1}{6}** 37. either a red or a green block? **\frac{5}{6}**

Cumulative Test

UNITS 1-4

Write the place value of the 3.

1. 12 358 604 2. 309 275 641 3. 823 560 491
Hundred thousands Hundred millions Millions

Write the numbers in order from smallest to largest.

4. 63 249 850, 63 250 967, 63 249 851, 62 349 850
62 349 850, 63 249 850, 63 249 851, 63 250 967
 Round to the nearest thousand.

5. 34 250 6. 169 049 7. 80 555 8. 119 862
34 000 169 000 81 000 120 000

Write as a decimal.

9. $\frac{7}{10}$ $\frac{14}{100}$ $\frac{10}{100}$ $\frac{3}{100}$ $\frac{12}{10}$ $\frac{10}{10}$
0.7 0.14 0.1 0.03 1.2 1.0

Copy and complete. Use < or >.

13. $12.6 \bullet 12.06$ 14. $82.45 \bullet 82.54$ 15. $41.88 \bullet 41.8$
7 < >

Add.

16. $\begin{array}{r} 16 \\ + 32 \\ \hline 48 \end{array}$ 17. $\begin{array}{r} 76 \\ + 25 \\ \hline 101 \end{array}$ 18. $\begin{array}{r} 596 \\ + 87 \\ \hline 683 \end{array}$ 19. $\begin{array}{r} 440 \\ + 892 \\ \hline 1332 \end{array}$ 20. $\begin{array}{r} 786 \\ + 2045 \\ \hline 2831 \end{array}$
 21. $\begin{array}{r} 658 \\ 209 \\ + 31 \\ \hline 898 \end{array}$ 22. $\begin{array}{r} 184 \\ 270 \\ + 932 \\ \hline 1386 \end{array}$ 23. $\begin{array}{r} 68\,792 \\ + 45\,308 \\ \hline 114\,100 \end{array}$ 24. $\begin{array}{r} 7.4 \\ + 1.8 \\ \hline 9.2 \end{array}$ 25. $\begin{array}{r} 89.01 \\ + 39.45 \\ \hline 128.46 \end{array}$

Subtract.

26. $\begin{array}{r} 56 \\ - 23 \\ \hline 33 \end{array}$ 27. $\begin{array}{r} 84 \\ - 39 \\ \hline 45 \end{array}$ 28. $\begin{array}{r} 193 \\ - 76 \\ \hline 117 \end{array}$ 29. $\begin{array}{r} 650 \\ - 281 \\ \hline 369 \end{array}$ 30. $\begin{array}{r} 3656 \\ - 1778 \\ \hline 1878 \end{array}$
 31. $\begin{array}{r} 7003 \\ - 415 \\ \hline 6588 \end{array}$ 32. $\begin{array}{r} 9200 \\ - 6423 \\ \hline 2777 \end{array}$ 33. $\begin{array}{r} 8645 \\ - 3956 \\ \hline 4689 \end{array}$ 34. $\begin{array}{r} 7.0 \\ - 3.6 \\ \hline 3.4 \end{array}$ 35. $\begin{array}{r} 51.2 \\ - 16.9 \\ \hline 34.3 \end{array}$

Multiply.

36. $\begin{array}{r} 20 \\ \times 7 \\ \hline 140 \end{array}$ 37. $\begin{array}{r} 76 \\ \times 5 \\ \hline 380 \end{array}$ 38. $\begin{array}{r} 43 \\ \times 9 \\ \hline 387 \end{array}$ 39. $\begin{array}{r} 700 \\ \times 6 \\ \hline 4200 \end{array}$
 40. $\begin{array}{r} 3000 \\ \times 4 \\ \hline 12\,000 \end{array}$ 41. $\begin{array}{r} 206 \\ \times 8 \\ \hline 1648 \end{array}$ 42. $\begin{array}{r} 7284 \\ \times 5 \\ \hline 36\,420 \end{array}$ 43. $\begin{array}{r} 1504 \\ \times 8 \\ \hline 12\,032 \end{array}$
 44. $\begin{array}{r} 61 \\ \times 40 \\ \hline 2440 \end{array}$ 45. $\begin{array}{r} 37 \\ \times 20 \\ \hline 740 \end{array}$ 46. $\begin{array}{r} 76 \\ \times 18 \\ \hline 1368 \end{array}$ 47. $\begin{array}{r} 54 \\ \times 38 \\ \hline 2052 \end{array}$
 48. $\begin{array}{r} \$1.67 \\ \times 5 \\ \hline \$8.35 \end{array}$ 49. $\begin{array}{r} 34.21 \\ \times 8 \\ \hline 273.68 \end{array}$ 50. $\begin{array}{r} \$0.55 \\ \times 34 \\ \hline \$18.70 \end{array}$ 51. $\begin{array}{r} 68.2 \\ \times 7 \\ \hline 477.4 \end{array}$
 Divide. *9.25*
 52. $\begin{array}{r} 9.25 \\ 4 \overline{)37} \end{array}$ 53. $\begin{array}{r} 9.4 \\ 9 \overline{)85} \end{array}$ 54. $\begin{array}{r} 51 \\ 6 \overline{)306} \end{array}$ 55. $\begin{array}{r} 61.75 \\ 4 \overline{)247} \end{array}$
 56. $\begin{array}{r} 13.1429 \\ 7 \overline{)92} \end{array}$ 57. $\begin{array}{r} 26.6 \\ 3 \overline{)80} \end{array}$ 58. $\begin{array}{r} 56.625 \\ 8 \overline{)453} \end{array}$ 59. $\begin{array}{r} 74.4 \\ 5 \overline{)372} \end{array}$
 60. $\begin{array}{r} 152 \\ 4 \overline{)608} \end{array}$ 61. $\begin{array}{r} 115.375 \\ 8 \overline{)923} \end{array}$ 62. $\begin{array}{r} 715 \\ 3 \overline{)2145} \end{array}$ 63. $\begin{array}{r} 633.2 \\ 9 \overline{)5699} \end{array}$
 64. $\begin{array}{r} 1752 \\ 2 \overline{)3504} \end{array}$ 65. $\begin{array}{r} 1005.4286 \\ 7 \overline{)7038} \end{array}$ 66. $\begin{array}{r} \$3.176 \\ 6 \overline{)\$19.06} \end{array}$ 67. $\begin{array}{r} \$24.73 \\ 2 \overline{)\$49.46} \end{array}$

Solve.

68. John went to the store to buy groceries. He took a \$5 bill. The groceries cost \$2.89. How much change did John get?
\$2.11
 69. Sherri lives 16.7 km from Montroy. Bev lives 7.8 km closer to Montroy than Sherri. How far does Bev live from Montroy?
8.9 km
 70. During the day the temperature rose 8°C from a low of 16°C. What was the high temperature for the day?
24°C
 71. If one box of crackers costs \$0.79, how much do 3 boxes cost?
\$2.37
 72. Half a dozen doughnuts cost \$2.70. What is the cost of one doughnut?
\$0.45

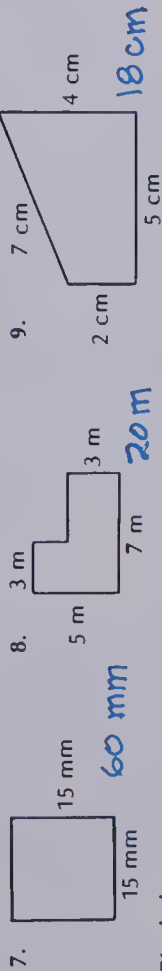
Cumulative Test

UNITS 5-7

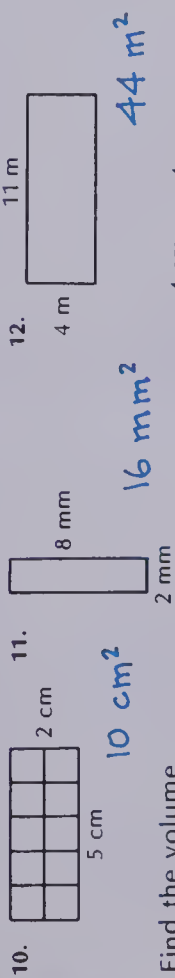
Copy and complete.

1. $4\text{ cm} = \blacksquare\text{ mm}$ **40** 2. $1\text{ m} = \blacksquare\text{ cm}$ **100** 3. $3000\text{ mm} = \blacksquare\text{ m}$ **3**
4. $1\text{ km} = \blacksquare\text{ m}$ **1000** 5. $20\text{ mm} = \blacksquare\text{ cm}$ **2** 6. $800\text{ cm} = \blacksquare\text{ m}$ **8**

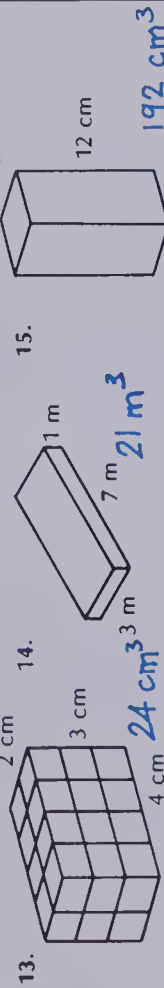
Find the perimeter.



Find the area.



Find the volume.



16. Which angle is a right angle?



17. Estimate the product of 189 and 23.

18. Estimate the product of 412 and 31.

19. Multiply.

20. $620 \times 34 = 21080$
21. $441 \times 80 = 35280$
22. $500 \times 90 = 45000$
23. $128 \times 95 = 12160$
24. $968 \times 74 = 71632$
25. $\$5.62 \times 34 = \191.08
26. $\$7.09 \times 83 = \588.47

- Divide.
27. $40 \overline{) 2375} = 59.375$
 28. $15 \overline{) 5} = 0.333$
 29. $51 \overline{) 1882} = 36.901$
 30. $30 \overline{) 264} = 8.8$
 31. $70 \overline{) 12886} = 184.085$
 32. $14 \overline{) 43071} = 3076.5$
 33. $35 \overline{) 23171} = 662.028$
 34. $68 \overline{) 6279} = 92.339$
 35. $50 \overline{) 9864} = 197.28$
 36. $16 \overline{) 37} = 2.3125$
 37. $37 \overline{) 16297} = 439.918$
 38. $65 \overline{) 91385} = 1405.923$

Multiply.

39. $\frac{1}{3} \times 9 = 3$
40. $\frac{1}{2} \times 10 = 5$
41. $\frac{2}{5} \times 5 = 2$
42. $\frac{3}{4} \times 12 = 9$

Write the ratio.

43. 5 people to each car **5:1**
44. 7 books for 3 children **7:3**

Write equivalent fractions.

45. $\frac{2}{3} = \frac{8}{12}$
46. $\frac{24}{36} = \frac{2}{3}$
47. $\frac{4}{20} = \frac{1}{5}$

Find the missing term.

48. $\frac{3}{5} = \frac{12}{20}$
49. $\frac{2}{8} = \frac{1}{4}$
50. $\frac{4}{5} = \frac{80}{100}$
51. $\frac{1}{3} = \frac{6}{18}$

Write as a decimal.

52. $\frac{81}{100} = 0.81$
53. $\frac{4}{5} = 0.8$
54. $\frac{3}{50} = 0.06$
55. $\frac{1}{4} = 0.25$

Compare the fractions. Use $>$ or $<$.

56. $\frac{3}{6} < \frac{5}{6}$
57. $\frac{1}{2} > \frac{1}{4}$
58. $\frac{2}{5} > \frac{3}{10}$
59. $\frac{2}{3} > \frac{7}{12}$

Solve.

60. Delores ran 1500 m. How much more than 1 km did she run?

61. The area of a rectangle is 672 cm². One side is 16 cm long.

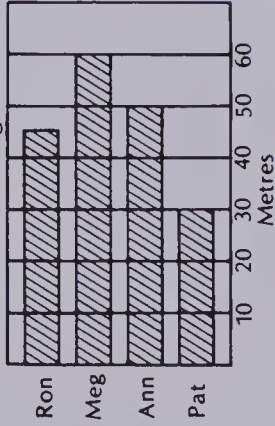
How long is the other side? **42 cm**

Does this problem have enough information?

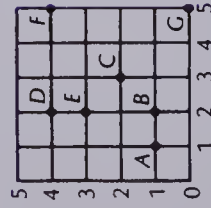
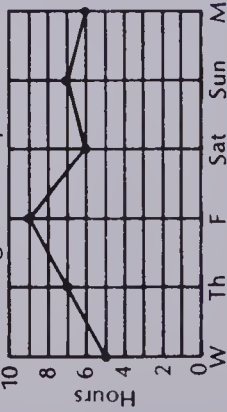
62. May baked 60 cookies for her party. $\frac{1}{2}$ of the children did not eat cookies. How many children ate cookies? **No**

UNITS 8-10

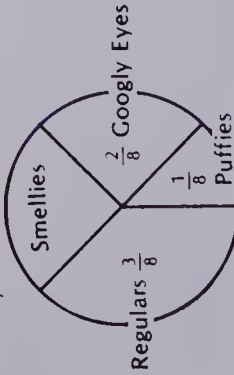
Students' Swimming Distances



Mr. Berger's Sleep Pattern



Cynthia's Stickers



- What is the longest distance any of the students can swim? **60 m**
- What is the shortest distance a student can swim? **30 m**
- How far can Ron swim? **45 m**

- On which day did Mr. Berger get the most sleep? **Friday**
- How much sleep did he get on Sunday? **7 h**
- On what day did he get the same amount of sleep as on Thursday? **Sunday**

What letter is at

7. (3, 2) 8. (5, 4) 9. (1, 1)?

What are the coordinates of

10. **D** 11. **B** 12. **G**?
(2, 4) (2, 1) (5, 0)

13. What fraction of Cynthia's stickers are puffies? **$\frac{1}{8}$**

14. Does she have more regular stickers or more googly-eye stickers? **Regular**

15. What fraction of her stickers are smellies? **$\frac{2}{8}$**

Multiply.

$$\begin{array}{r} 16. \quad 0.09 \quad 17. \quad 0.35 \quad 18. \quad 1.17 \quad 19. \quad 4.08 \quad 20. \quad 9.32 \\ \times 6 \quad \times 8 \quad \times 5 \quad \times 4 \quad \times 7 \\ \hline 0.54 \quad 2.80 \quad 5.85 \quad 16.32 \quad 65.24 \end{array}$$

$$\begin{array}{r} 21. \quad 54 \quad 22. \quad 0.8 \quad 23. \quad 6.7 \quad 24. \quad 2.9 \quad 25. \quad 8.1 \\ \times 0.2 \quad \times 0.4 \quad \times 0.3 \quad \times 3.6 \quad \times 7.1 \\ \hline 10.8 \quad 0.32 \quad 2.01 \quad 10.44 \quad 57.51 \end{array}$$

Divide.

$$\begin{array}{r} 26. \quad 3 \overline{)9.3} \quad 27. \quad 4 \overline{)9.2} \quad 28. \quad 5 \overline{)3.5} \quad 29. \quad 7 \overline{)7.84} \quad 30. \quad 6 \overline{)19.86} \\ \underline{3.1} \quad \underline{2.3} \quad \underline{0.7} \quad \underline{1.12} \quad \underline{3.31} \end{array}$$

Write as a decimal.

$$\begin{array}{r} 31. \quad \frac{1}{4} \quad 32. \quad \frac{1}{5} \quad 33. \quad \frac{4}{5} \quad 34. \quad \frac{3}{10} \quad 35. \quad \frac{9}{20} \\ \hline 0.25 \quad 0.2 \quad 0.8 \quad 0.3 \quad 0.45 \end{array}$$

Match.

36. line segment **b**

37. ray **c**

38. closed curve **g**

39. pentagon **m**

40. hexagon **d**

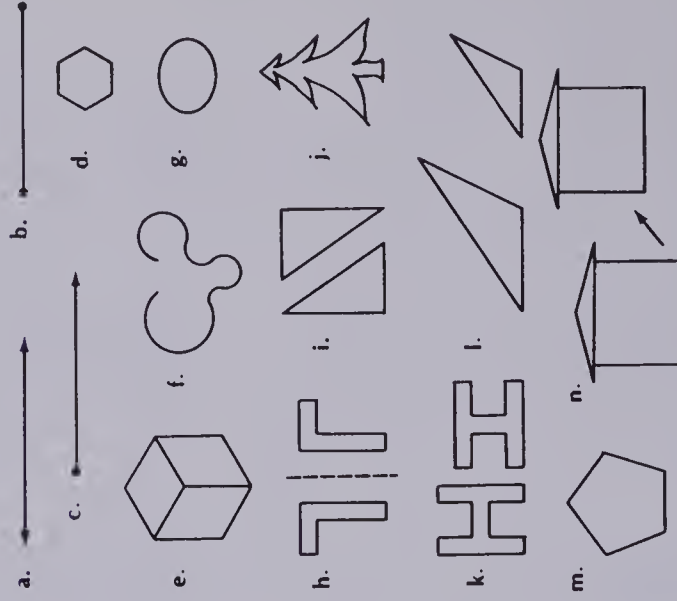
41. slide **n**

42. a figure that is symmetrical **j**

43. flip **h**

44. $\frac{1}{4}$ turn **k**

45. congruent triangles **i**



Cumulative Test

UNITS 11-14

Round to the nearest hundredth.

1. 0.273 **0.27** 2. 4.185 **4.19** 3. 3.097 **3.10** 4. 8.992 **9.00**

Compute.

5. $\begin{array}{r} 45.327 \\ + 1.908 \\ \hline 47.235 \end{array}$ 6. $\begin{array}{r} 9.184 \\ - 2.419 \\ \hline 6.765 \end{array}$ 7. $\begin{array}{r} 0.314 \\ \times 5 \\ \hline 1.570 \end{array}$ 8. $\begin{array}{r} 1.728 \\ \times 3 \\ \hline 5.184 \end{array}$

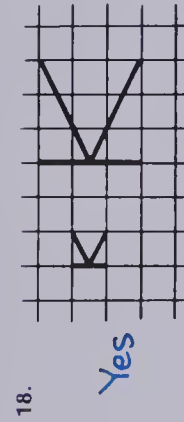
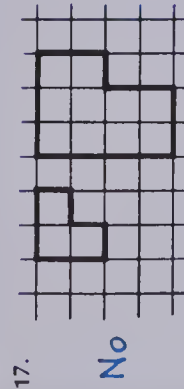
Write as a percent.

9. 0.17 **17%** 10. $\frac{125}{100}$ **125%** 11. $\frac{31}{50}$ **62%** 12. 2.30 **230%**

Add or subtract.

13. $\begin{array}{r} \$2182.67 \\ + 908.43 \\ \hline \$3091.10 \end{array}$ 14. $\begin{array}{r} \$7100.50 \\ - 5605.25 \\ \hline \$1495.25 \end{array}$ 15. 8 h 10 min 16. 12:30
 $\begin{array}{r} - 2 \text{ h } 30 \text{ min} \\ \hline 5 \text{ h } 40 \text{ min} \end{array}$ 17. 15:15

Are the two figures similar?



Solve.

19. There are 24 stamps per page. How many stamps are there in 12 pages? **288**
20. If 8 stickers cost \$1.49, how much will 16 stickers cost? **\$2.98**
21. If a car travels at 80 km/h, how far will it go in 3 h? **240 km**
22. On five different days, Joe earned \$3.50, \$5.00, \$4.25, \$2.50, and \$3.00. How much did he average per day? **\$3.65**
23. When it is 04:00 in Halifax, what time is it in Ottawa? **03:00**

24. Name the multiples of 12 between 50 and 100.

25. Find the LCM of 4 and 5. **60, 72, 84, 96**

26. Which number is divisible by 9?

a. 24 b. 32 c. 101 d. 108 e. 206

27. Name the factors of 24. **1, 2, 3, 4, 6, 8, 12, 24**

28. Which number is a prime number?

a. 32 b. 16 c. 27 d. 39 e. 13

29. Find the GCF of 8 and 12. **4**

Compute.

30. $9 - (4 \times 2)$ **1** 31. $9 - 4 \times 2$ **1**
32. $3 \times (30 \div 5)$ **105** 33. $(6 \times 50) + (6 \times 7)$ **342**

Write the mixed numeral.

34. $\frac{7}{5}$ **$1\frac{2}{5}$** 35. $\frac{15}{10}$ **$1\frac{5}{10}$** 36. $\frac{17}{8}$ **$2\frac{1}{8}$** 37. $\frac{7}{4}$ **$1\frac{3}{4}$**

Add or subtract.

38. $\begin{array}{r} \frac{3}{10} \\ + \frac{4}{10} \\ \hline \frac{7}{10} \end{array}$ 39. $\begin{array}{r} \frac{6}{8} \\ - \frac{1}{8} \\ \hline \frac{5}{8} \end{array}$ 40. $\begin{array}{r} 5\frac{1}{4} \\ + 2\frac{1}{4} \\ \hline 7\frac{2}{4} \end{array}$ 41. $\begin{array}{r} 3\frac{3}{10} \\ + 1\frac{8}{10} \\ \hline 5\frac{11}{10} \end{array}$
42. $\begin{array}{r} - \frac{3}{4} \\ \frac{7}{4} \\ \hline 4\frac{4}{4} \end{array}$ 43. $\begin{array}{r} - 1\frac{2}{5} \\ 5\frac{3}{5} \\ \hline 4\frac{1}{5} \end{array}$ 44. $\begin{array}{r} \frac{3}{6} \\ - \frac{3}{8} \\ \hline \frac{5}{24} \end{array}$ 45. $\begin{array}{r} 8\frac{5}{6} \\ - 3\frac{5}{6} \\ \hline 5\frac{0}{6} \end{array}$

Solve.

46. There are 2 red marbles, 1 blue marble, and 3 green marbles in a bag. You pull out one. What is the probability of picking a. a blue one? **$\frac{1}{6}$** b. a red or a green one? **$\frac{5}{6}$**

Addition

Add.

1.
$$\begin{array}{r} 0 \\ +9 \\ \hline 9 \end{array}$$
2.
$$\begin{array}{r} 24 \\ +8 \\ \hline 32 \end{array}$$
3.
$$\begin{array}{r} 36 \\ +45 \\ \hline 81 \end{array}$$
4.
$$\begin{array}{r} 17 \\ +58 \\ \hline 75 \end{array}$$
5.
$$\begin{array}{r} 534 \\ +70 \\ \hline 604 \end{array}$$
6.
$$\begin{array}{r} 842 \\ +109 \\ \hline 951 \end{array}$$
7.
$$\begin{array}{r} 375 \\ +626 \\ \hline 1001 \end{array}$$
8.
$$\begin{array}{r} 9 \\ 4 \\ +5 \\ \hline 18 \end{array}$$
9.
$$\begin{array}{r} 16 \\ 25 \\ +30 \\ \hline 71 \end{array}$$
10.
$$\begin{array}{r} 93 \\ 50 \\ +48 \\ \hline 191 \end{array}$$
11.
$$\begin{array}{r} 6798 \\ +5385 \\ \hline 12183 \end{array}$$
12.
$$\begin{array}{r} 46575 \\ +1984 \\ \hline 48559 \end{array}$$
13.
$$\begin{array}{r} 14262 \\ +89751 \\ \hline 104013 \end{array}$$
14.
$$\begin{array}{r} 73625 \\ 8479 \\ +29362 \\ \hline 111466 \end{array}$$
15.
$$\begin{array}{r} 8.9 \\ +4.2 \\ \hline 13.1 \end{array}$$
16.
$$\begin{array}{r} 56.7 \\ +37.5 \\ \hline 94.2 \end{array}$$
17.
$$\begin{array}{r} 33.4 \\ +16.81 \\ \hline 50.21 \end{array}$$
18.
$$\begin{array}{r} 28.16 \\ +13.59 \\ \hline 41.75 \end{array}$$
19.
$$\begin{array}{r} 45.062 \\ +61.839 \\ \hline 106.901 \end{array}$$
20.
$$\begin{array}{r} 835.104 \\ +196.507 \\ \hline 1031.611 \end{array}$$
21.
$$\begin{array}{r} \$6.79 \\ +3.21 \\ \hline \$10.00 \end{array}$$
22.
$$\begin{array}{r} \$253.84 \\ +476.29 \\ \hline \$730.13 \end{array}$$

Subtraction

Subtract.

1.
$$\begin{array}{r} 6 \\ -0 \\ \hline 6 \end{array}$$
2.
$$\begin{array}{r} 74 \\ -6 \\ \hline 68 \end{array}$$
3.
$$\begin{array}{r} 91 \\ -32 \\ \hline 59 \end{array}$$
4.
$$\begin{array}{r} 80 \\ -39 \\ \hline 41 \end{array}$$
5.
$$\begin{array}{r} 760 \\ -41 \\ \hline 719 \end{array}$$
6.
$$\begin{array}{r} 384 \\ -197 \\ \hline 187 \end{array}$$
7.
$$\begin{array}{r} 500 \\ -321 \\ \hline 179 \end{array}$$
8.
$$\begin{array}{r} 4621 \\ -2358 \\ \hline 2263 \end{array}$$
9.
$$\begin{array}{r} 6050 \\ -1394 \\ \hline 4656 \end{array}$$
10.
$$\begin{array}{r} 9000 \\ -5673 \\ \hline 3327 \end{array}$$
11.
$$\begin{array}{r} 3.5 \\ -2.8 \\ \hline 0.7 \end{array}$$
12.
$$\begin{array}{r} 36.3 \\ -16.4 \\ \hline 19.9 \end{array}$$
13.
$$\begin{array}{r} 55.63 \\ -28.49 \\ \hline 27.14 \end{array}$$
14.
$$\begin{array}{r} 20.03 \\ -2.46 \\ \hline 17.57 \end{array}$$
15.
$$\begin{array}{r} 53.914 \\ -26.958 \\ \hline 26.956 \end{array}$$
16.
$$\begin{array}{r} 800 \\ -321.459 \\ \hline 478.541 \end{array}$$
17.
$$\begin{array}{r} \$64.35 \\ -23.58 \\ \hline \$40.77 \end{array}$$
18.
$$\begin{array}{r} \$503.26 \\ -214.98 \\ \hline \$288.28 \end{array}$$

Multiplication

Multiply.

1.
$$\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$$
2.
$$\begin{array}{r} 50 \\ \times 3 \\ \hline 150 \end{array}$$
3.
$$\begin{array}{r} 70 \\ \times 8 \\ \hline 560 \end{array}$$
4.
$$\begin{array}{r} 6 \times 0 \\ 5 \times 5 \\ \hline 45 \end{array}$$
6.
$$\begin{array}{r} 65 \\ \times 3 \\ \hline 195 \end{array}$$
7.
$$\begin{array}{r} 76 \\ \times 9 \\ \hline 684 \end{array}$$
8.
$$\begin{array}{r} 400 \\ \times 6 \\ \hline 2400 \end{array}$$
9.
$$\begin{array}{r} 800 \\ \times 5 \\ \hline 4000 \end{array}$$
10.
$$\begin{array}{r} 6000 \\ \times 7 \\ \hline 42000 \end{array}$$
11.
$$\begin{array}{r} 876 \\ \times 4 \\ \hline 3504 \end{array}$$
12.
$$\begin{array}{r} 150 \\ \times 3 \\ \hline 450 \end{array}$$
13.
$$\begin{array}{r} 7171 \\ \times 9 \\ \hline 64539 \end{array}$$
14.
$$\begin{array}{r} 1493 \\ \times 7 \\ \hline 10451 \end{array}$$
15.
$$\begin{array}{r} 15. \\ \times 5 \\ \hline 75 \end{array}$$
16.
$$\begin{array}{r} 34 \\ \times 20 \\ \hline 680 \end{array}$$
17.
$$\begin{array}{r} 69 \\ \times 80 \\ \hline 5520 \end{array}$$
18.
$$\begin{array}{r} 83 \\ \times 12 \\ \hline 996 \end{array}$$
19.
$$\begin{array}{r} 60 \\ \times 15 \\ \hline 900 \end{array}$$
20.
$$\begin{array}{r} 26 \\ \times 21 \\ \hline 546 \end{array}$$
21.
$$\begin{array}{r} 82 \\ \times 55 \\ \hline 4510 \end{array}$$
22.
$$\begin{array}{r} 12.65 \\ \times 7 \\ \hline 88.55 \end{array}$$
23.
$$\begin{array}{r} \$0.89 \\ \times 4 \\ \hline \$3.56 \end{array}$$
24.
$$\begin{array}{r} 14.9 \\ \times 8 \\ \hline 119.2 \end{array}$$
25.
$$\begin{array}{r} 9.3 \\ \times 26 \\ \hline 241.8 \end{array}$$
26.
$$\begin{array}{r} 728 \\ \times 50 \\ \hline 36400 \end{array}$$
27.
$$\begin{array}{r} 634 \\ \times 80 \\ \hline 50720 \end{array}$$
28.
$$\begin{array}{r} 139 \\ \times 25 \\ \hline 3475 \end{array}$$
29.
$$\begin{array}{r} 204 \\ \times 37 \\ \hline 7548 \end{array}$$
30.
$$\begin{array}{r} 351 \\ \times 96 \\ \hline 33696 \end{array}$$
31.
$$\begin{array}{r} \$3.17 \\ \times 18 \\ \hline \$57.06 \end{array}$$
32.
$$\begin{array}{r} \$9.67 \\ \times 42 \\ \hline \$406.14 \end{array}$$
33.
$$\begin{array}{r} 0.4 \\ \times 5 \\ \hline 2.0 \end{array}$$
34.
$$\begin{array}{r} 23.7 \\ \times 8 \\ \hline 189.6 \end{array}$$
35.
$$\begin{array}{r} 6.9 \\ \times 35 \\ \hline 241.5 \end{array}$$
36.
$$\begin{array}{r} 0.43 \\ \times 6 \\ \hline 2.58 \end{array}$$
37.
$$\begin{array}{r} 0.91 \\ \times 28 \\ \hline 25.48 \end{array}$$
38.
$$\begin{array}{r} 7.06 \\ \times 4 \\ \hline 28.24 \end{array}$$
39.
$$\begin{array}{r} 8.51 \\ \times 93 \\ \hline 791.43 \end{array}$$
40.
$$\begin{array}{r} 86 \\ \times 0.4 \\ \hline 34.4 \end{array}$$
41.
$$\begin{array}{r} 0.5 \\ \times 0.9 \\ \hline 0.45 \end{array}$$
42.
$$\begin{array}{r} 0.6 \\ \times 0.8 \\ \hline 0.48 \end{array}$$
43.
$$\begin{array}{r} 3.7 \\ \times 0.9 \\ \hline 3.33 \end{array}$$
44.
$$\begin{array}{r} 74.5 \\ \times 0.4 \\ \hline 29.80 \end{array}$$
45.
$$\begin{array}{r} 39.1 \\ \times 0.5 \\ \hline 19.55 \end{array}$$
46.
$$\begin{array}{r} 81.5 \\ \times 4.6 \\ \hline 374.90 \end{array}$$
47.
$$\begin{array}{r} 36.7 \\ \times 9.2 \\ \hline 337.64 \end{array}$$
48.
$$\begin{array}{r} 0.115 \\ \times 8 \\ \hline 0.920 \end{array}$$
49.
$$\begin{array}{r} 0.604 \\ \times 53 \\ \hline 32.012 \end{array}$$
50.
$$\begin{array}{r} 0.893 \\ \times 67 \\ \hline 59.831 \end{array}$$

Division

Divide.

1. $8 \div 4$ **2**
2. $0 \div 9$ **0**
3. $6 \overline{)48}$ **8**
4. $9 \overline{)80}$ **8.8**
5. $4 \overline{)31}$ **7.75**
6. $5 \overline{)50}$ **10**
7. $8 \overline{)320}$ **40**
8. $6 \overline{)5400}$ **900**
9. $5 \overline{)85}$ **17**
10. $4 \overline{)72}$ **18**
11. $7 \overline{)86}$ **12.286**
12. $3 \overline{)89}$ **29.6**
13. $5 \overline{)426}$ **85.2**
14. $2 \overline{)507}$ **253.5**
15. $8 \overline{)444}$ **55.5**
16. $3 \overline{)816}$ **272**
17. $6 \overline{)600}$ **100**
18. $7 \overline{)905}$ **129.286**
19. $8 \overline{)5688}$ **711**
20. $4 \overline{)6482}$ **1620.5**
21. $9 \overline{)6945}$ **771.6**
22. $2 \overline{)8247}$ **4123.5**
23. $5 \overline{)6090}$ **1218**
24. $7 \overline{)9231}$ **1318.714**
25. $8 \overline{)3.88}$ **\$0.485**
26. $6 \overline{)8.15}$ **\$1.3583**
27. $3 \overline{)9.02}$ **\$3.006**
28. $2 \overline{)60}$ **30**
29. $5 \overline{)536}$ **107.2**
30. $9 \overline{)6357}$ **706.3**
31. $6 \overline{)7206}$ **1201**
32. $8 \overline{)6479}$ **809.875**

Division

1. $20 \overline{)75}$ **3.75**
2. $60 \overline{)900}$ **15**
3. $80 \overline{)724}$ **9.05**
4. $30 \overline{)516}$ **17.2**
5. $31 \overline{)85}$ **2.742**
6. $12 \overline{)90}$ **7.5**
7. $24 \overline{)83}$ **3.4583**
8. $46 \overline{)851}$ **18.5**
9. $33 \overline{)722}$ **21.879**
10. $56 \overline{)978}$ **17.464**
11. $30 \overline{)690}$ **23**
12. $80 \overline{)915}$ **11.4375**
13. $50 \overline{)1864}$ **37.28**
14. $40 \overline{)3303}$ **82.575**
15. $35 \overline{)604}$ **17.257**
16. $24 \overline{)714}$ **29.75**
17. $89 \overline{)905}$ **10.169**
18. $66 \overline{)4860}$ **73.636**
19. $53 \overline{)9174}$ **173.094**
20. $67 \overline{)2319}$ **34.612**
21. $4 \overline{)3.2}$ **0.8**
22. $8 \overline{)8.64}$ **1.08**
23. $7 \overline{)45.15}$ **6.45**
24. $6 \overline{)804.6}$ **134.1**
25. $9 \overline{)326.7}$ **36.3**
26. $6 \overline{)20.4}$ **3.4**
27. $12 \overline{)32.4}$ **2.7**
28. $15 \overline{)67.5}$ **4.5**

Problem Solving

Solve.

1. Sam bought 2 children's tickets for \$3.00 each and 1 adult ticket for \$4.50. What was the total cost of the tickets? **\$10.50**
2. A jet can fly 835 km/h. How far can it go in 5 h? **4175 km**
3. Three pitchers contain a total of 2481 mL of juice. If there is an equal amount in each pitcher, how much juice is in one pitcher? **827 mL**
4. A rectangular yard is 30 m long and 18 m wide. What is its perimeter? **96 m**
5. Sandy has 52 hockey cards and 34 baseball cards. She gives 12 hockey cards to a friend. How many hockey cards does she have left? **40**
6. Mr. Turner plans to give each child 2 hot dogs and 1 bag of not chips at a party. How many hot dogs should he buy? **enough information**
7. In December, Leonard's best time in speed skating was 47.75 s. In January, it was 44.295 s. By how much did he improve his time? **3.455 s**
8. Kate and Joanna's room is 5 m by 5 m. Their father is putting in a partition so each will have her own room. Kate is older and will get 60% of the space. What will be the area of her room? **15 m²**
9. Make a drawing of Kate and Joanna's room showing where the partition will be. Write in the measurements of each room.
10. Bob spent $\frac{3}{7}$ of a week at a friend's house and $1\frac{1}{7}$ week on a trip with his family. How long was he away from home? **$1\frac{4}{7}$ week or 1 week 4 days or 11 days**

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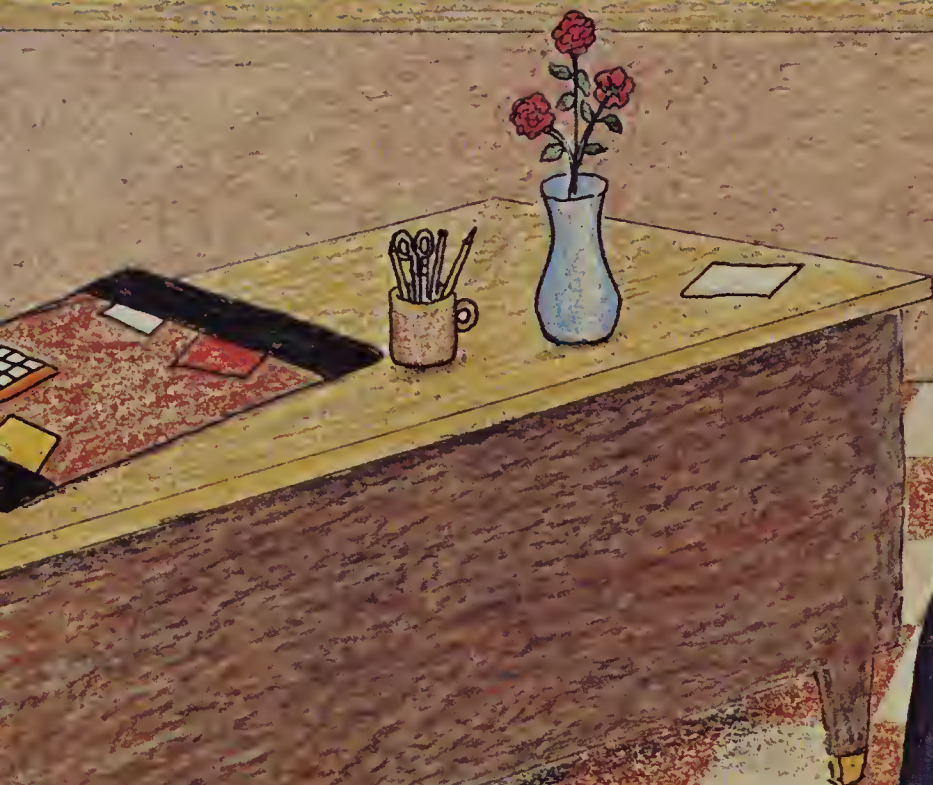
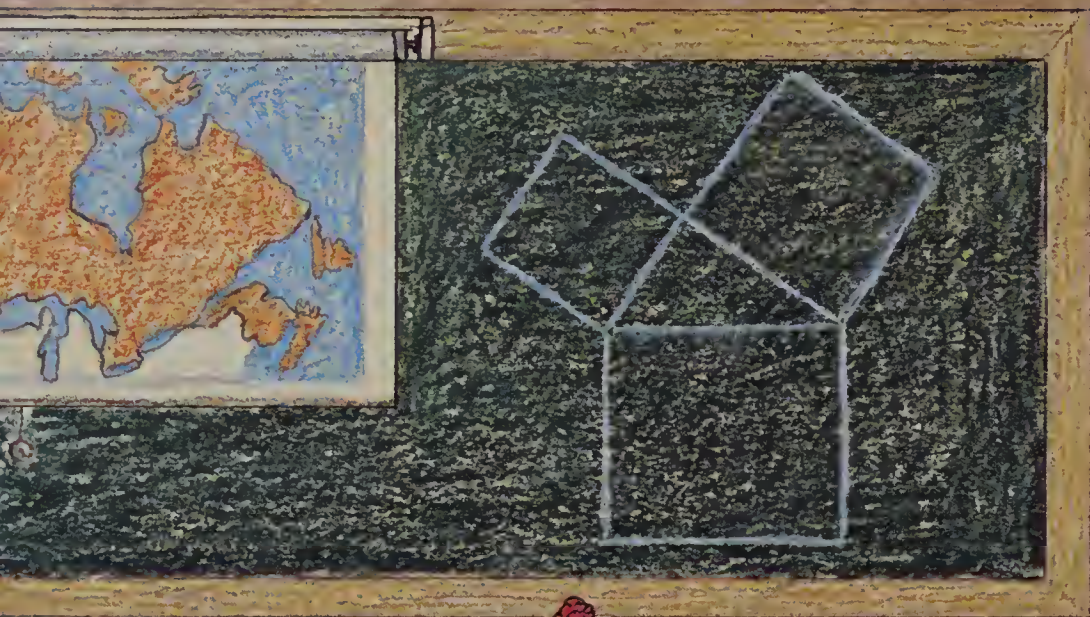
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